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THE BUILDER

VOL. CI.—No. 3579. SEPTEMBER 8, 1911.

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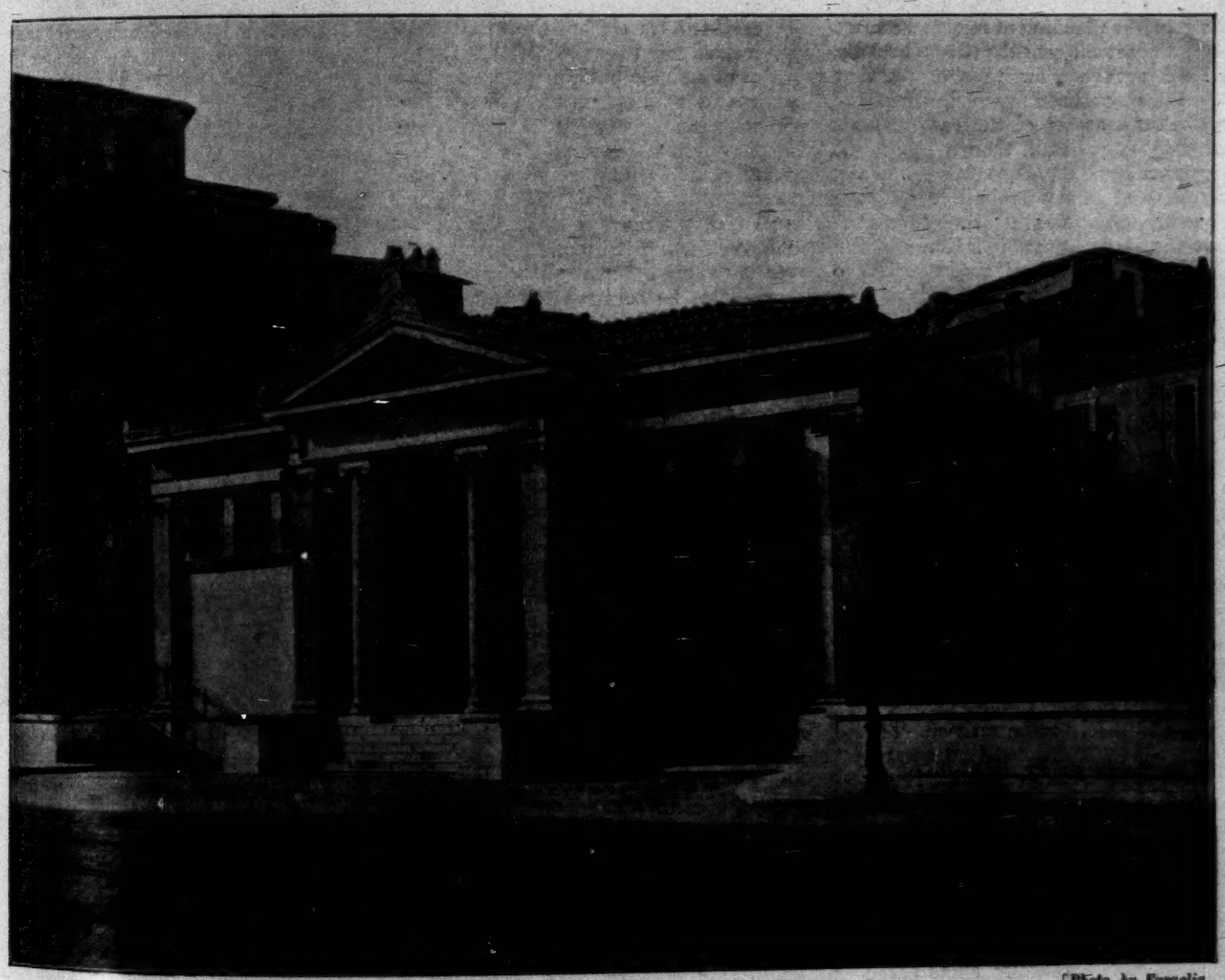


[Photo. by Faraglia.

The Museo Barracco, Rome. (*See page* 268.)

CIVICS AND THE ARCHITECT.

We must offer our congratulations to the R.I.B.A. in that they have not been discouraged by the recent rebuff in the matter of St. Paul's Bridge, and are continuing the work inaugurated at the Congress last October, having for its aim the education of both the public and the architect in the artistic aspects of town planning.

The publication of Part I. of the R.I.B.A. "Suggestions to Promoters of Town Planning Schemes" receives the support of the Right Hon. John Burns, who contributes a short commendatory Preface, explaining the necessity for co-operation and a better organisation to secure harmony between the means of industrial life, the pleasure of domestic surroundings, and the sense of civic beauty.

The document prepared by the R.I.B.A. strikes us as particularly impartial and well balanced in its definition of the position of the architect in regard to town planning. It would have been impossible to draw up suggestions of any value without referring to the numerous and many-sided aspects of town planning, but, while these are cited, the expressions of opinion are carefully limited to those that might appropriately come from an architectural body.

The headings used to subdivide the various sections simplify the consideration of the subject, and, while it must be admitted that other points would arise

beyond those dealt with, it may be claimed that they fairly represent the main questions that occur in civic development.

The first section deals with the essentials of the general civic survey—topographical, physical, historical, and economic; the second with the technical methods suitable for recording the actual state of a town. Section three is entitled "New Traffic Facilities," and treats of the working out of the lines of future development and the consideration of the means of access and transport such developments demand. Then in section four we pass on to "Main and Subsidiary Centres," in which a more direct appeal to the architect is made, for, though this portion opens with a note on the economic desirability of a system of centres, it passes on to indicate the artistic value of emphasising important points by grouping public buildings there.

In sections five to eight we return to various aspects of the traffic question in regard to the planning of roads; here we see the practical considerations broadly outlined with a view to showing that they have not been ignored, while the architectural aspect of the case is dealt with in greater detail, though in a spirit so comprehensive and so free from any expression of narrow prejudices in favour of one type of treatment or another as to leave the utmost possible latitude in any application of the rules, if such they can be called, that it lays down. If this portion is open to any criticism at all, it can only be on the ground that it may be a little too catholic, and therefore not quite sufficiently definite in its pronouncements.

Section nine is devoted to the allocation of areas for special purposes, a matter in which we think more difficulty is likely to arise than in any other. However desirable such a procedure may be proved to be, it is so much at variance with the normal habits of the British race that much water will flow under the bridges before it is fully established.

We have been so accustomed to consult only our individual judgment in the selection of sites for various purposes that the submission to authority in such a matter is likely to be resisted. Indeed it may fairly be claimed that at present our municipal bodies are hardly sufficiently educated in this question to be completely relied on. However, time will rectify this, and, after all, it is not so much the architect's affair. Though some in the profession may be well qualified to give useful advice, it will be less in the capacity of architect than in that of one technically experienced in building undertakings.

Turning to section ten, we have a brief but suggestive summary of the requirements in regard to parks, recreation grounds, and other open spaces; here, again, anything likely to unduly limit the ideals of the designer is carefully avoided.

Last, but certainly not least, we come to the question of the buildings; and here the architect's case is stated in the following terms:—

"In the completed town it is the buildings which are seen and produce whatever effect, good or bad, is attained; therefore, the problem of town planning in its final form is essentially an architectural problem. The working out of the exact form in which the requirements can be satisfied so as to produce a fine town is a function of the creative imagination; and it can only properly be performed by one who has had the architectural training necessary to enable him to adjust the proportions of the many parts, so to place the different buildings, and group them upon the ground and in relation to each other that when erected they may compose properly.

The preparation of all the data upon which the design must be based hardly falls within the province of the architect; and it would seem that this formulation of the city's requirements, and of the limits within which the designer must work, is the proper sphere of the surveyor (aided, of course, by the engineer, the valuer, the economist, the sociologist, and the antiquarian). He should survey the conditions, suggest the requirements, and should be consulted as to the methods of satisfying them; but for the design of the town plan, the architecturally-trained mind is as essential as for the design of a single building; for the work consists in applying upon a wider field and with greater scope the same principles which govern the designing of individual buildings. The appreciation of the relation of masses and voids, the apprehension of the right points for emphasis, and the power to combine into one creation many differing parts by bringing them into harmonious proportion are equally required in the field of town planning, if there is to be produced that rhythm in the plan and that spacious breadth of ordered elevation in the groups of buildings which so largely constitute the beauty and grandeur of cities."

We have little to add to the paragraph just quoted. Architects will see that the R.I.B.A. has made its claim for them modestly but firmly; such a claim will doubtless secure, in due course, the recognition it deserves, provided, and provided only, that architects themselves justify it. It is for the architect to see that he is thoroughly qualified to advise in view of the fact that at any time his advice may be asked for on the question of civic improvements. Let him acquire such a general knowledge of the economic and social aspects of this subject as will enable him to put forward his artistic conception in a practicable form, and thus ensure attention. Of course, no man with ideals of any kind can expect to escape criticism, but if he can meet the critics on their own ground of hard facts his artistic aims will, rightly or wrongly, stand a better chance of securing support.

R.I.B.A. SESSIONAL MEETINGS 1911-12.

The following are the subjects to be dealt with at meetings of the Royal Institute of British Architects arranged for next session:—

Collegiate Architecture (Mr. Edward P. Warren, F.S.A., F.R.I.B.A.), The Newer Responsibilities of Architects (The Practice Standing Committee), Colour Decoration (Sir Alfred East, A.R.A., and Mr. Edgar Wood), Modern French Sculpture (Mr. H. Heathcote Statham, F.R.I.B.A.), The French Renaissance (Mr. W. H. Ward, M.A., Cantab., A.R.I.B.A.). Modern Methods of Construction (Mr. Wm. Dunn, F.R.I.B.A.), The Royal Institute Library and Some of its Contents (Mr. C. Harrison Townsend, F.R.I.B.A.), Recent University Architecture in the United States (Mr. R. A. Cram).

THE CENSUS OF PRODUCTION AND THE BUILDING INDUSTRIES.

THE general character of the Census of Production, issued in the form of Blue Books by the Board of Trade, has been so fully dealt with by the daily Press that it only remains to us to summarise the portion (Part IX.) now published, showing the magnitude of the industries connected with building. As this can only be clearly appreciated on the basis of the proportion these industries bear to the whole output of the country, we should first take note of the fact that, according to this census, the grand totals for all trades in the United Kingdom are as follows:—

1. Gross output, selling value, or value of work done, 1,757,000,000*l.*
2. Materials used cost 1,019,000,000*l.*
3. Work given out, amount paid to other firms, 26,000,000*l.*
4. Net output, 712,000,000*l.*
5. Persons employed, 6,936,000.

In addition to the number of persons employed given above there are about 100,000 outworkers, so that the average number of persons employed in work covered by the census must be in round figures seven millions.

It should be noted that the output of one trade or factory may constitute materials for other trades or factories, so that the figures relating to gross output and to materials involve a considerable amount of duplication. No duplication, however, is involved in the figures of net output. By adding to the net output the value of materials purchased from sources outside the industries covered by the table (*e.g.*, from agriculture or from abroad) there would be obtained, for all these industries regarded as one unit, the value of the aggregate output ready for consumption or export. The value of such materials was not separately shown in the returns, but it is hoped that it may be estimated at a later period from information available to the Census of Production Office.

The Office register of building and contracting firms was compiled from the trade and local directories, and 118,366 schedules were issued. Of these, however, about 45,000 had to be cancelled as duplicates, or as issued to jobbing men, bankrupts, deceased persons, or persons no longer in business, and nearly 10,000 were transferred to other trades. From the information in the possession of the Census Office it is believed that, of the firms to whom schedules were issued, few of any magnitude have failed to furnish returns.

The "output" shown in the following table is the gross output of each trade, *i.e.*, where goods pass through the hands of several manufacturers at different stages, their quantity and value has been registered at each stage. Similarly, where work such as building work has been partly sub-let to sub-contractors, the value of the whole work and of each of the parts so sub-let has been independently recorded. The value of this gross output is, therefore, greater than the value of the goods ready for export or consumption manufactured by each trade considered as a unit, or than the value of the work done by each trade considered as a unit, and the value of the "materials

used" shown in the tables is, for the same reason, greater than the actual value of the materials used by each trade:—

—	Gross Output. Selling Value or Value of Work Done. (1)	Materials Used. Cost. (2)	Work Given Out. Amount Paid to Other Firms. (3)	Net Output. Excess of Column (1) over Columns (2) and (3). (4)	Persons Employed. (5)	Net Output per Person Employed. (6)
	£	£	£	£		£
Building and Contracting Trades	87,967,000	38,000,000	6,404,000	42,954,000	513,961	84
Heating, Ventilating, and Sanitary Engineering Factories and Workshops	2,885,000	1,277,000	45,000	1,563,000	14,144	111
Slate Quarries	1,148,000	104,000	—	1,044,000	14,240	73
Limestone Quarries	1,908,000	495,000	—	1,413,000	16,188	87
Quarries, other than Slate, Limestone, and Iron Quarries	3,775,000	534,000	—	3,241,000	43,184	75
Miscellaneous Factories and Workshops	7,813,000	2,008,000	51,000	4,764,000	50,822	94
Gas Undertakings:—						
(a) Companies	20,838,000	9,292,000	—	11,546,000	54,946	210
(b) Public Authorities	10,769,000	5,037,000	—	5,732,000	28,585	201
Waterworks Undertakings:—						
(a) Companies	2,172,000	445,000	—	1,727,000	4,716	366
(b) Public Authorities	8,437,000	1,110,000	—	7,327,000	17,343	422
Electricity Undertakings:—						
(a) Companies	3,182,000	1,186,000	—	1,996,000	8,499	235
(b) Public Authorities	5,721,000	2,149,000	—	3,572,000	14,119	253
Total	156,615,000	63,236,000	6,408,000	86,881,000	780,747	—

In addition to the work included in this table, the Government, the local authorities, and canal, dock, harbour, and tramway companies have to their credit a net output of 86,881,000*l.*, and give employment to 219,361 persons.

We find that under the heading Buildings, as apart from other forms of construction, the cost of erection, alteration, and repair is estimated at 73,414,000*l.*, and the report then takes up the various industries in detail. The briefest summary of the contents of this valuable document would far exceed the space we could give. Our only course is to refer our readers to the Blue Book itself, with the assurance that they will find the statistics clearly and systematically arranged, and that, as far as possible, the subdivision as judiciously classified; though, of course, in an industry possessing so many ramifications as that of building it is not always easy to draw an exact line as to production that comes under this heading and that which does not.

NOTES.

Architecture for the Masses.

THE *American Architect* makes the interesting announcement that for the future it is proposed to teach the elements of architecture in the public schools of Los Angeles, California. Some of the architects of that town have been requested to make suggestions, and to draw up a tentative scheme for the consideration of the education authorities. As the value of architecture has for some time past been fully recognised by the Universities of America, it is perhaps not so surprising that the more highly-cultured section of the community, which has benefited by a University training, is alive to the advantage of spreading a wider knowledge among the people at large. Considering the importance of architecture in the life of the State, the intimate manner in which it enters into almost every aspect of the life of the individual, and the tremendous influence it exercises on the daily comfort, the health, and happiness of the people, it is a healthy sign that, at any rate, in Los Angeles, architecture is no longer to be regarded simply as a branch of polite learning suitable for cultivation by the leisured classes in the academic atmosphere of the University, but as a practical matter which appeals direct to the everyday necessities of the worker. It is in the recognition of this fact by the general mass of the people that the chief hope for the future of architecture seems to lie, and there would appear to be no better way of encouraging its recognition than by familiarising the coming generation with the elementary facts and principles of fine building. Should the examples so worthily set by Los Angeles be successful, it will no doubt be generally followed in the United States, but it is perhaps too much to expect that it will be immediately initiated here. We have yet to interest academic circles; to convince those in a position to influence the management of our elementary schools; to educate our masters.

The Natural History and New Science Museums.

THE outlines of the settlement reported to have been arrived at between the conflicting claims of the Natural History Museum and the New Science Museum seem to be in the nature of a compromise. The Spirit Room now occupying the site immediately adjoining the Natural History Museum on the north side—which it was proposed to give up to the Science Museum—is to remain. The Science Museum is to be built to the north, and space is to be left on its site for future extensions of the Spirit Room. This looks as if one building will be dovetailed into the other in a way which, we fear, will render any fine architectural treatment impossible. We recognise the difficulties of the problem, but these difficulties are, in our opinion, largely due to the attempt to wedge in another large building, requiring space for future extensions, on an insufficient site. We have already pointed out (July 21, p. 61) the initial mistake in dealing with the whole group of public buildings from the Albert Hall to the Natural History Museum, and can only repeat that if it is worth while building a new Science Museum it is worth while to provide it with an adequate site, even if it has to be paid for. In the meanwhile we are glad to see that there appears to be no intention to tamper with the site of the Natural History Museum, but we shall know more exactly what the proposals are when the Trustees meet in October.

St. George's Barracks, Trafalgar-square.

H.M.'S OFFICE OF WORKS are about to clear the site of St. George's Barracks at the rear of the National Gallery. The barracks were built as a portion of the extensive alterations carried out in that quarter in pursuance of the Acts of 1813 and 1826 (53 Geo. III., c. 121, and 7 Geo. IV., c. 77). They stand on the site of the Earl of Leicester's Green Mews and the Crown, or Upper, Mews—component parts of the Royal Mews which were transferred thither from Bloomsbury in 1534. In the *Builder* of January 17, 1903, is illustrated Wales's print, of about 1750, depicting the south front of the State horses' stables which stood along the south side of Upper Mews—the middle gateway opened into the Upper and Green Mews to the north. That building has been ascribed to Kent, but it seems that the elevation was designed by Lord Burlington, who in 1732 re-arranged the Mews for George II.

Rural Housing.

MR. EDGAR L. CHAPPELL has contributed to the *South Wales News* a series of articles on the deplorable condition of many of the old rural cottages in Wales. It may be within the cognizance of many of our readers that such a state of things may be paralleled in the agricultural labourers' cottages to be found in many other districts of the British Isles. The fact that, despite these drawbacks, the rural death rate is lower than the urban cannot relieve those responsible from the obligation to provide suitable housing for the farm hand, and where the responsibility cannot be fixed on the land owner it becomes the duty of the local authority to deal with the matter. That the death rate from consumption is higher among women than among men in these rural areas may be regarded as an indication of the insanitary state of the cottage home. The man is more exposed to the inclemency of the weather, but this is less injurious than indoor life under unhealthy conditions.

THE STORY OF THE BRIDGE.

By WALTER SHAW SPARROW.

V.—THE EVOLUTION OF TIMBER BRIDGES.

THIS subject is very important, and we took a rapid glance at it in my first article, but no time will be lost if we try to get into closer touch with its broad aspects.

There are three lines of descent in the lineage of timber bridges, and each of the three comes down to our times from a very remote period in the life of prehistoric man. Sometimes they unite and sometimes they intersect, and the results produced by their separate action and by their intersection evolve traditions and types in the art of building. It is convenient to put a name on these lines of descent:—

1. Primitive endeavour, which often hardens into stereotyped forms of unskilled carpentry.

2. Primitive carpentry of a progressive order.

Brandon Creek. Type of Norfolk Timber Bridge.
From Francis Stone's "Norfolk Bridges."

3. Skilled and constructive carpentry in which mechanics and fine art go hand in hand together.

T e first line of descent had its rise in two ways—in overthrown trees, which may be called windfall bridges, and in branches of trees that happened to span rivers from opposite banks. These were the earliest suspension bridges, and natives use them now in Central Africa.

The nature-made bridge is older than the remains of the Galley Hill man, the earliest known Briton, whose age has been estimated by Professor Arthur Keith as about 170,000 years, perhaps more, and whose skeleton, dug up from palæolithic gravel in Kent, together with teeth and bones of the mammoth, a tooth of the hippopotamus, and a lion's foot, is well within the range of variation in recent man. This wonderful fact is admitted by all anthropologists.

So we may rest assured that the cradle centuries in the nursery of the human race preceded the Galley Hill man by a long, indefinite time—long enough to get rid of simian characteristics. Indeed, the Galley Hill man was contemporary with remarkable attainments in the line of art, sculpture, engraving, and painted decorations on the walls of caves. Hunting, too, required infinite resource and pluck and skill, because the fauna comprised lions, bears, hyænas, sabre-toothed tigers, bisons, the mammoth, and the woolly rhinoceros. It is clear, then, that 170,000 years ago, or thereabouts, the intelligence of man was alert and wideawake; and this is a thing to be kept in mind when we think of the romantic descent of bridges from a tree which a storm of wind had hurled astride some deep hollow in the ice or in the land, making a safe footway for an early ancestor of the Galley Hill Briton.

From this accident we pass on to a tree which man himself cut down deliberately in order that it might span a dangerous gap in a field of ice or an abyss formed by a mountain torrent. Human intelligence, the inventor of sculpture and painting, would wish to do what a gale of wind had done by accident; and from that moment the first principles of secure bridge-making were discovered. Not only was the footway strong and firm, but branches growing from the tree-trunk gave support to the hands. Any bough that blocked up the way could be topped off with a flint axe, till at last no handholds would be left save those which were convenient and necessary. Even to this day in country woods we find rustic bridges having not much more art, bridges so narrow and so simple that the footway, roughly hewn from a tree-trunk, is rudely guarded at the sides with handrails of dressed branches.

This first type of bridge is a narrow pathway for men walking single file. But its descendants are many and various. I will mention a few. The earliest would be suggested by circumstances of war. A single tree-trunk stretching from bank to bank would not be of much help in a rapid attack, since the act of crossing it single file would be a slow movement and quite easy to repel. On the other hand, if several tree-trunks were laid side by side several warriors could advance abreast; and if the tree-trunks were placed at some little distance from each other, then covered transversely with branches and with turf and soil, a still wider bridge could be made with the exercise of less invention than that which Quaternary man loved to exhibit both in his rock-painting of animals and in his sculpture. If you consult Don Antonio de Ulloa (1716-1795), you will find that bridges of this type have long been made in the mountainous parts of South America. He says that the wooden bridges "consist of only four long beams laid close together over the precipice, and form a path about a yard and a half in breadth, being just sufficient for a man to pass over on horseback."

Other types of the primitive bridge were suggested by man's earlier efforts to make a home for his family. Thus, for example, the construction of the first lake-dwelling was a great event in the primeval craft of bridge-making; and we infer, from evidence that still exists in different parts of the world, that the foundation of timber logs under lake-dwellings became useful also in spanning rivers, as among the ancient Gauls, whose methods of bridge-building united the footway of felled trees to a criss-cross of tree-trunks to form piers and abutments. This Gaulish handicraft has survived in Savoy, and we find an Eastern parallel in the log piers of Kashmir bridges, where a descent from lake-dwellings is often strikingly suggested by quaint little rude booths and shops along the footways.

Again, another development from the tree-bridge is what I may call the step-ladder bridge such as you will find at Bettwys-y-Coed, where the Miners' Bridge takes you at a sharp angle from a low level to the summit of a bank. That is a ladder rather than a bridge; and a similar thing, but more adventurous and intricate, was seen in Tibet by Capt. Turner in 1783. This was a bridge of turpentine-wood forming two ladders; these were inclined towards each other, but separated at their tops by a considerable space, across which was a level platform. The ladders tapered upwards, their lower ends were fixed in masonry, and handrails aided the ascent. This bridge, in 1783, was said to be 140 years old. Its purpose was to escape from floods, and so we may connect it with that old type of European bridge which ascended at a sharp angle to the centre and then shelved downwards. Many railway lines of to-day are crossed by stepped bridges having a horizontal platform at top to connect their sides.

But these bridges are all firm and heavy, and you will think of other primitive examples which are frail, like Congo bridges of boughs and stakes and bindweed. Whence came these fragile structures? From the primeval art of the round hut, from the architecture of rods interlaced with osiers and plastered with mud and clay? Stick bridges and bamboo bridges belong to a phase of human handicraft having a certain frail elegance, a certain revolt against rude and clumsy heaviness. Such work is often ineffectual, yet it lives on in a good many parts of the world, and here and there it has some architectural charm, notably in the roofed bridges of bamboo at Sumatra, a protection against heat. In another old type of covered bridge, namely, the Swiss, the aim is to keep the footway free from snow. But the odd thing is that the timber bridges of Switzerland are still primitively rude in construction; they seem to show no advance on the Pons Sublicius of the Romans.

Several authorities have attempted to restore the Pons Sublicius from descriptions given in the historians, and I note two of the restorations, one by Canina and the other by Colonel Emy. They differ much. Canina strengthens the footway between each span, fixing a beam slantwise from each road bearer to one of the pier timbers. Colonel Emy, on the other hand, chooses a slighter design, in which I do not feel the genius of the Roman people. That the Sublician bridge was a solid structure, very difficult to destroy, is vividly shown in the legend of Horatius Cocles and the great fight which he and his two companions fought against the whole Etruscan army under Porsena. It was necessary for them to keep the enemy at bay while the Romans broke down the bridge behind them, and the

Ditchingham and Bungay. Type of Norfolk Timber Bridge.
From Francis Stone's "Norfolk Bridges."

story does not lead us to suppose that many axes made a gap without much difficulty.

The Roman timber bridges, as described by the historians, have had many modern descendants. Palladio built one at Bassano, the Bridge of Brenta, but he added a roof carried by slender wooden pillars. There were five arches of 12½ metres each, and a roadway 9 metres wide. The beams bearing from pile to pile were strengthened with straining beams and with braces; this formed a rude approach to an arch of timber, and like an arch it exerted a lateral thrust and required abutments. Perhaps you have seen illustrations of a wooden bridge designed by Robert Stevenson and built over the Clyde at Glasgow in the years 1831 and 1832. The main principles were precisely similar to those both in Palladio's work and in the drawing by Canina of the Pons Sublicius.

Stevenson's bridge had fourteen spans, each of 34 ft., measured from centre to centre of the piles forming the piers, and giving in all a waterway of 476 ft., uninterrupted except by the narrow width of the piles. A span of framework consisted of seven ribs, each composed of three beams—that is to say, of two diagonal braces and a horizontal straining beam. The braces were 13 in. in depth and 12 in. broad, and each straining beam was 12 in. square. The whole structure was carried by thirteen rows of bearing piles. Seven piles made a row, pitched at a distance of 5 ft. 2 in. apart, and secured to each other by four pairs of collar braces.

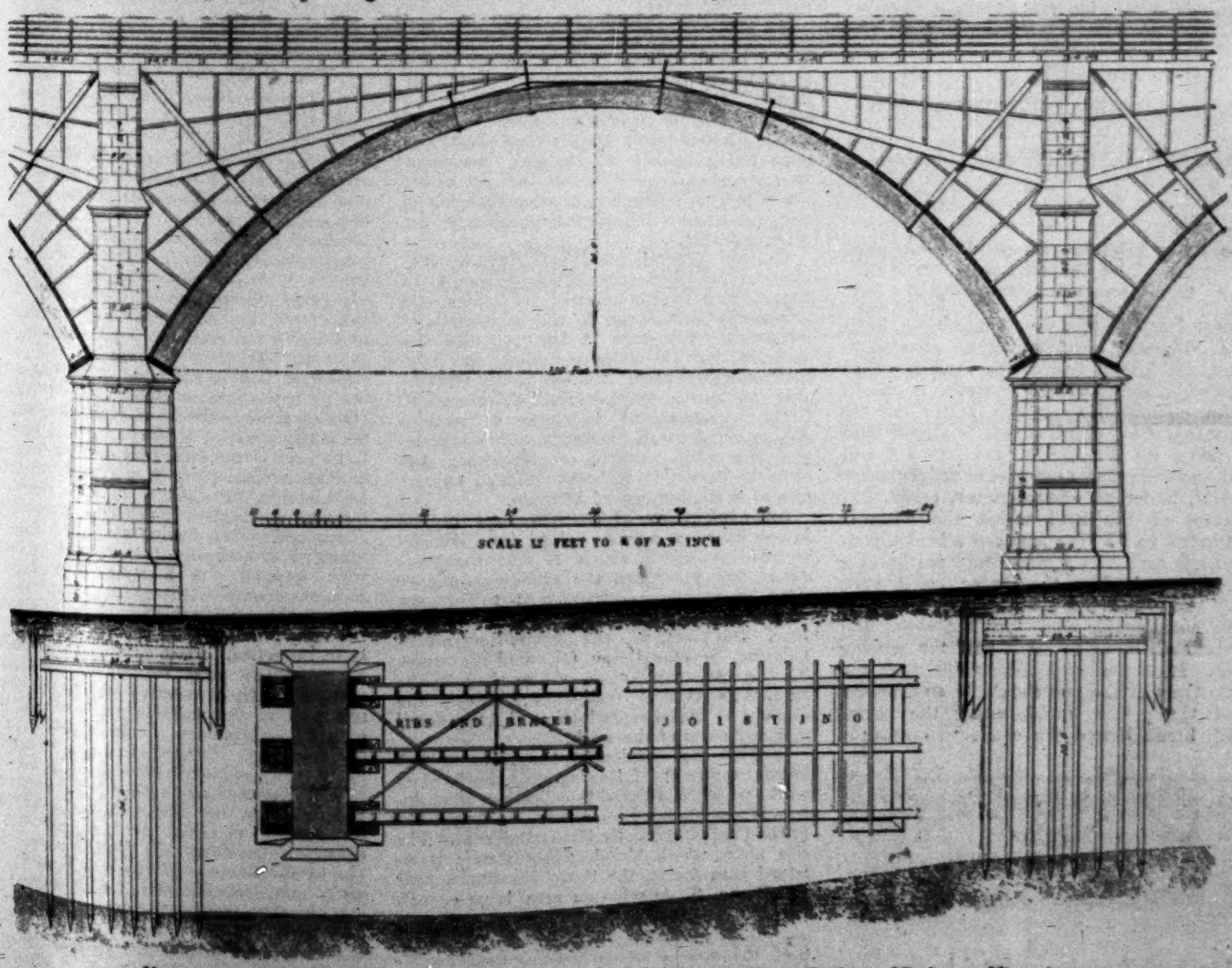
To find European timber bridges of rare excellence we must study the three great masterpieces designed and brought to completion by the brothers Grubenmann, and destroyed during the war of 1799. Ulric and Jean Grubenmann were village carpenters, born at Teufen, in the canton of Appenzell. Ulric seems to have been the abler of the two; certainly he was a man of true genius, who gained unrivalled knowledge of what could be done in the spanning

Mendham. Type of Norfolk Timber Bridge.

From Francis Stone's "Norfolk Bridges."

of great distances by a skilled use of corbelled and trussed bearings. He began the bridge of Schaffhausen in 1755-56, and in 1758 his work was complete. The total distance covered in two spans was 364 ft.; the stone pier was 8 ft. out of a straight line, and the angle pointed upstream. The abutment near Schaffhausen was 171 ft. from the angle, and from the angle to the opposite shore was 193 ft. Ulric would gladly have spanned the whole distance in a straight line and in one magnificent bay, but the authorities interposed, ordering him to find use for a masonry pier remaining from a stone bridge which a flood had ruined in 1754. Telford believed that Ulric Grubenmann could have built the whole structure over the Rhine in a single suspension from abutment to abutment. So perfect was the work, so admirably scarfed, trussed, strutted, braced, bolted up, and suspended, that only two faults could be found with it—namely, the roof was too heavy and ugly, and the parts were too dependent on each other, so that an injury to one portion of the structure from a cannon-ball, for instance, might have proved disastrous to the bridge as a structure.

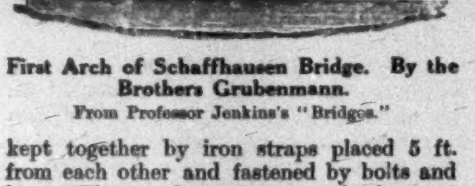
Grubenmann's methods were simple. "The braces proceeding from each abutment," said Telford, "are continued to the beam which passes along the top of the uprights, and the lowest of these general braces are actually united under that beam, thereby forming a continued arch between the abutments, the chord line of which is 364 ft. and the versed sine about 30 ft. These braces are kept in a straight direction by the uprights, which are placed 17 ft. 5 in. apart. If this bridge had been formed in a straight line between the abutments I can see no reason why this form of construction should not have supported a roadway of about 18 ft. in breadth, as well as a slight roof; because, in that case, all the weight



Newcastle, North Shields, and Tynemouth Railway: Willington Dean Railway Viaduct. Victorian.

arising from the braces which proceed from the middle pier would have been saved, and the roof might have been made much simpler and lighter."

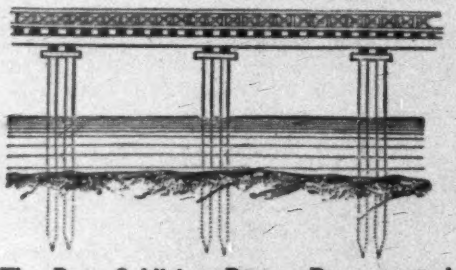
While Ulric Grubenmann was working at Schaffhausen his brother John built a bridge quite similar in kind at Reichenau, 240 ft. in a single span; and then, some years later, the two brothers constructed their Wittingen Bridge over the Limmat, near Baden. It had a span of 390 ft. The form of construction was different. Seven beams were built close upon each other, forming a catenarian arch between the abutments, with a rise of 25 ft. The beams were of oak, in lengths of 12 ft. or 14 ft., breaking joint in the manner of masonry. They were not fastened by pins, bolts, or scarfings, but were



First Arch of Schaffhausen Bridge. By the Brothers Grubenmann.
From Professor Jenkins's "Bridges."

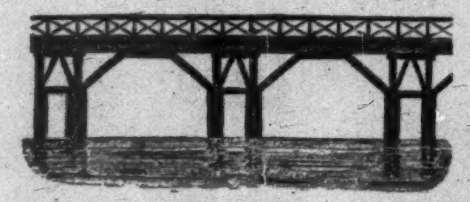
kept together by iron straps placed 5 ft. from each other and fastened by bolts and keys. The roadway intersected them at about the middle of their rise.

The influence of the Grubenmann brothers travelled to America, where it found in Bludget an able interpreter, for Bludget's bridge over the Portsmouth River was similar in principles to the bridge at Schaffhausen over the Rhine, and its span was 250 ft. Since that time the evolution of timber bridges has remained in the U.S.A., where it may be studied in work having great variety, for it ranges from the criss-cross of logs for bearing piles to the most intricate combinations of lattices and trusses. There is at times too much intricacy. "Many wooden American bridges are trusses which



The Pons Sublicius, Rome. Reconstructed by Colonel Emy.
From Professor Jenkins's "Bridges."

almost defy analysis, the designs being, however, obviously suggested by an attempt to combine at least two of the three types of bridges. No advantage whatever is gained by a combination of this kind; on the contrary, great disadvantage is almost sure to follow its adoption, namely, that it will be impossible that each part of the structure should, under all circumstances, carry that portion of the load which the designer entrusted to it. For suppose a bridge constructed partly as a girder and partly as a suspension bridge, the girder being very stiff and deep, the chain perfectly flexible with considerable dip. Let the chain and girder each be fit to carry half the passing load. It is perfectly conceivable that the deflections of the two should be so different that the girder would, under the actual load, break before the chain was sensibly



The Pons Sublicius, restored by Canina

strained, or the difference in the relative dip of the chain and depth of the girder might be such as to cause the former to give way first." (Professor Fleeming Jenkin.)

And many American bridges provoke another criticism—they belong to a nation that believes itself to be free from the dangers of war in its own home territories. Think of the giant Portage Bridge, and imagine a modern shell falling upon its woodwork, which rises on a huge scaffold of timber frames over the Genesee River, 234 ft. above water level. The scaffold piers rest on masonry piles above the level of floods, and they taper upwards to a double gallery forming a support for the railroad. The general effect has the trellised fascination of a scaffolding, and we see in the design that same passion for a sort of airmanship in light craftsmanship to which street architecture in the U.S.A. owes the sky-scraper.

In a later paper an attempt will be made to consider modern bridges in their relation to those preparations for war that turn so many countries into armed camps.

THE MUSEO BARRACCO, ROME.

By Lionel B. Budden, M.A.*

In Italy the artistic movement known as the Greek Revival left few architectural memorials. As the Latin builders were for the most part unaffected by the mediæval forms of constructive expression common to the greater part of Europe between the XIIth and XVth centuries, so throughout the period of Gallic and Teutonic Hellenism, some three hundred years later, Italian architecture pursued a traditional course. But the tendency of modern times towards a cosmopolitan style, and the international influence of the French and American ateliers have, during the last two decades, become irresistible factors in the development of Classic design, even south of the Alps; and if examples of the change in point of view and of practice are few enough, they are of profound significance, since they indicate in some degree the future possibilities of a vital manner.

The neo Grec cemetery at Milan has real breadth and imaginative force. The pavilion of the Royal Rowing Club at Venice shows a sensitive delicacy in design worthy of Burton. Between these extremes of an infinitely flexible register are other works in Rome, Florence, and Naples that reveal the same living quality of thought, the same sincerity of endeavour—works that are as far removed from archæological scène-painting as the most modern and original products of the American schools.

To this general rule there is one conspicuous exception, the Museo Barracco, in Rome. It is largely conventional in idea, and professedly antiquarian in the inspiration of its detail. Yet since it has provided the occasion for an elaborate essay in polychromatic decoration, it is sufficiently remarkable to merit very careful consideration. Certain monumental buildings in modern Athens afford parallel instances of the application of a complex system of polychromy, but their treatment is different, though expressive of a similar mental attitude.

An explanation of the character of the Museo Barracco may be gained from the circumstances under which it was designed. About ten years ago the architect, Signor Alex. Koch, was commissioned to prepare designs for a small private museum of sculpture. His client was the famous Roman connoisseur, Senator Baron Giovanni Barracco. To the latter's influence, rather than to the architect's natural inclination, is due the attempt at literal reproduction of Attic detail in many parts of the work.

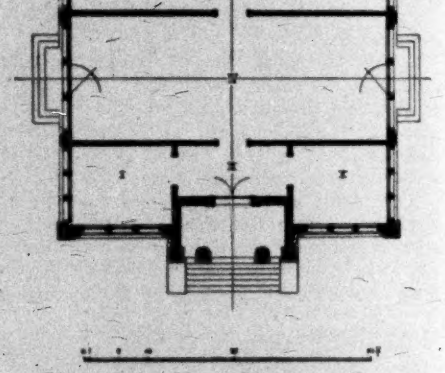
In 1904 the erection of the Museum was begun, and in the following year the finished work, with the admirable collection of sculpture it was intended to contain, was presented to the City of Rome by Baron Barracco. The site upon which the building stands is an island area facing the Corso Emanuele, near the Ponte S. Angelo—an area large enough

* For correction of certain notes I am indebted to Mr. Ernest Gee, who made a careful study of the building in the winter of 1910 as Travelling Scholar of the Liverpool University School of Architecture.—L. B. B.

to permit of a surround of shrubs on the north, south, and east sides; a low wall serving as the continuous pedestal to an ornamental iron railing encloses the garden. Thus isolated, and with the dull plaster fronts of the neighbouring houses acting as a simple foil, the effective brilliance of the design is immeasurably assisted.

Its construction is deceptive, even upon close examination. On the street façade the capitals, bases, and shafts of the columns and pilasters, the podium and steps and the walls up to the fretted band are of white stone. The band itself, the window piers, and main entablature are of plaster. Under the portico, the cornice, and architrave to the main entrance are stone, and the spaces above the fret on either side of the door head have a plaster infilling, the entire side and back elevations (the latter marred by a recent addition) are of plaster, the steps alone being stone. All the doors are constructed in wood, stained a bronze green, and heavily studded. Frosted glass in gilded metal frames is used for the windows.

To some extent mistakes in composition are cloaked by the brilliant colouring of the whole. In bright sunshine every detail has a rich vivid value that combines to produce a general impression of sumptuousness and to deaden intellectual realisation of the



Plan of the Museo Barracco, Rome.

I. Curator's Room.
II. Store.
III. Vestibule.
IV. & V. Permanent Exhibition Galleries.
VI. Store Extension.

quality of the architecture. The disposition of the main Order itself in relation to the wall surface on either side of the portico is ill-considered, for the vertical lines of the pilasters produce spaces that are awkward proportionally; and, in addition, the entablature is made to appear to be insufficiently supported over the spaces thus formed. With this error in judgment is prepetrated a blunder in the elementary principles of composition. At the junctions of the portico and main face of the building all respond to the end pilasters is omitted. The recessed pilaster alone is echoed in each case, and the full-angle pilasters of the portico are intended to be read at the same time, both as responds and as integral parts of a complete feature. If mistakes of such a nature are fairly frequent in English Renaissance work—Inigo Jones and Wren having sanctified them by repeated commission—they cannot be risked with impunity in a style that demands absolute clarity of thought. Again, the purpose of the window piers is clumsily achieved through either ignorance or disregard of logical practice. From Schinkel to Alexander Thomson the great masters of the Revival realised in their executed work the possible solutions of the æsthetic problem that here occurs. Subsidiary Ionic piers coming directly below an entablature proportioned to an Order considerably larger in scale than that of the piers themselves they found only to be practicable in the form of three-quarter, half, or quarter piers in combination with a column of the Order, *i.e.*, in the manner employed in the case of the end piers in the work under consideration. To justify their standing free and still retaining Ionic slenderness of proportion a subsidiary entablature, with repressed cornice and designed in relation to their own height, must be introduced

directly below the main entablature. Instances of indiscretion in detail could be multiplied, but to little profit.

It is as an exercise in colour that the design is intended to be accepted, and as such alone can it be most relevantly criticised. I have already remarked that in the convention of the colouring the work is reminiscent of several modern performances in Athens—in particular Hansen's Academy; but the convention is bolder, harder, and certainly less Greek. A broad effect is obtained from the domination of certain main tones—the light red of the tile roof, the blue of the tympanum and of the frieze to the main entablature, the dark red of the lower portion of the window piers, the bronze-green of the doors, and the glistening white of the main architrave, columns and pilasters, walls, podium, and steps. With these as the determining factors in the arrangement subordinate colour themes are elaborated for every minor part. Practically every member is treated in some manner, though the range of pigments is very restricted—primary red and blue, bronze-green, gilt, yellow ochre, and terra-cotta.

The main entablature and acroteria—both apparently influenced in their design by the late Hellenistic work till recently contained in the Pergamon Museum in Berlin—are given an Ionian brilliance by the lavish application of unrelated colours, under which the rather irresolute character of the decorative adjuncts and the delicate profiling of the members below them are alike obscured. Palmettes, white, yellow, and red, composed with leaves and scrolls, on a variegated background of blue and yellow ochre, form, however, a combination unprecedented even in Pergamean acroteria; whilst the polychromy of the cornice is extraordinarily fresh. Fillets of white and gilt; a cyma, patterned into alternately-recurring spaces of yellow and blue by white anthemion (tooled to appear like carved stone), and punctuated with yellow lions' heads; bead and reels, terra-cotta, yellow, and red; white fasciæ; egg and dart moulds of blue, terra-cotta, and white; painted yellow waterleaves under the soffit; and on the soffit, flat and slightly sunk, a yellow-ochre fret on a white ground; finally, white dentils picked out by vermilion interspaces.

In definite contrast to this minute and intricately-conceived system comes a frieze of blue, broken only over the portico by an inscription panel—white with terra-cotta lettering. Between the frieze and an equally simple architrave of three white fasciæ are tænia mouldings treated in the elaborate manner of the cornice, white and gilt fillets, a terra-cotta bead mould, and a small cyma-reversa, on which is painted yellow and blue waterleaf ornament.

The rich complexity of the cornice is again echoed in the capitals to the columns and pilasters. On the abaci the egg and dart *motif* is marked out in yellow and terra-cotta on a white ground; green is used for the fillets of the volutes, and red for the eyes, the channels being left white; blue and yellow is applied to the egg and dart above the necking, from which the latter is separated by a gilt bead-mould (that develops into a red and white bead and reel beyond the cushion); white anthemion on a yellow ground comprises the treatment of the necking. Thin terra-cotta lines emphasise the arrises of the white-fluted columns and of the fluted faces of the angle pilasters. (On the unfluted faces of the latter the lines recur simply as a pattern form.) Red pigment similarly distinguishes the ¼-in. by ¼-in. jointing of the ashlar walls and of the side and rear plaster walls.

In various combinations and rearrangements the colours and painted motives already described enrich the bases of the columns and pilasters, the side-door cornices, the caps and bases of the window piers, and the fretted sill on which the piers stand. The climax is reached in the treatment of the interior of the portico, which may be regarded as the *pièce de résistance* of this whole effort in polychromatic art. A film of rich colour—gilt interwoven with blues, reds, and yellows—covers the architrave and rosettes, the consoles, and cornice of the main entrance, whilst upon either side of the door-head and above the fret level are paintings on a brown surface, conceived and executed in the manner of the Attic vase scenes of the Vth century.

Archæological though the inspiration of the polychromy undoubtedly is, and insufficient though the scholarship necessary for its realisation may have been, the experiment attempted is by no means valueless. If it is unreliable as an example of ancient practice, it contributes something definite to the science of modern architecture and something that could only have been obtained by material illustration. It assists towards an estimate of the possibilities of development of a whole system of colour decoration.

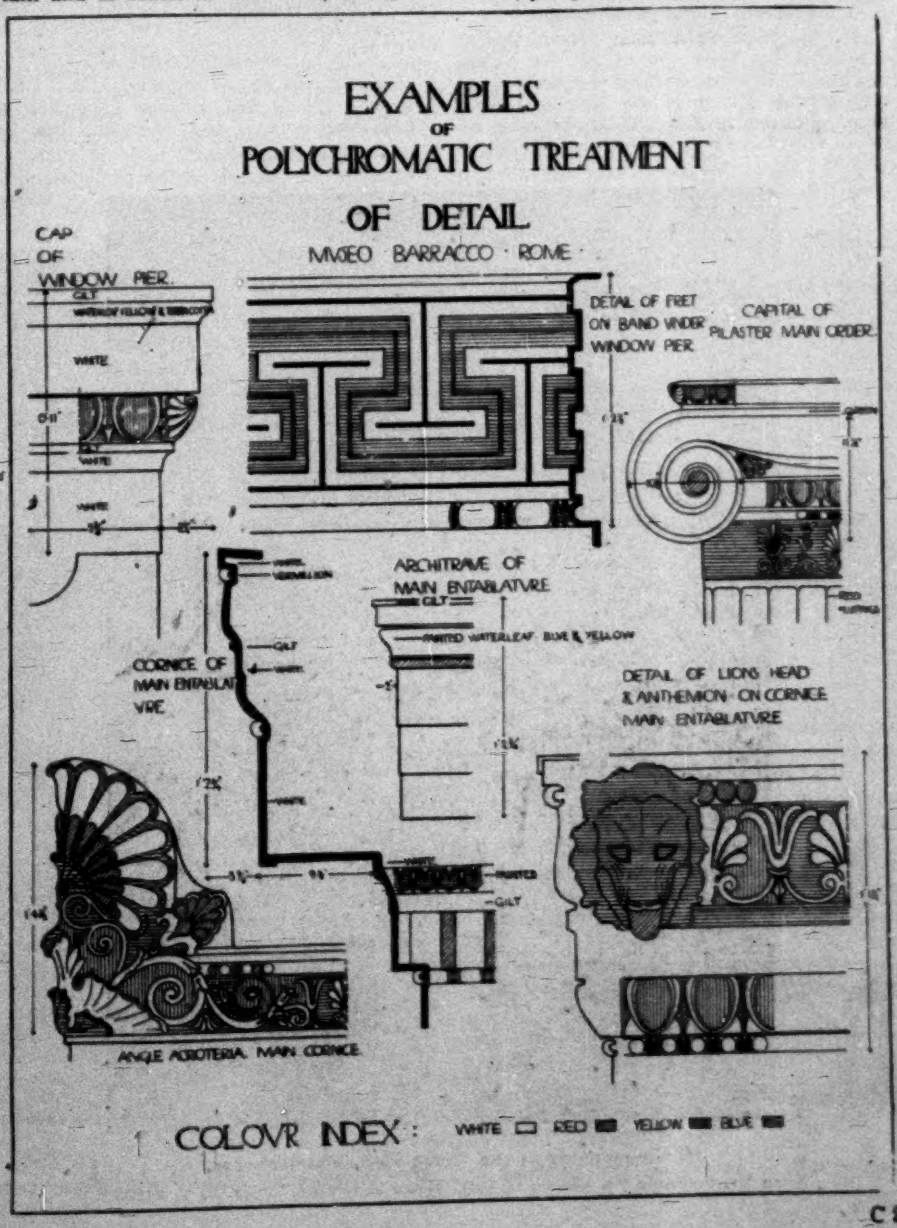
Close examination of the architectural detail reveals a mistaken application of many forms, and in the plaster portion of the work a coarseness in surface texture and in the articulation of members that is directy opposed to the treatment demanded by the material. Now, as the work very clearly shows, the crudity of minor indiscretions is almost completely destroyed by a veneer of pigment. It is lost in the paraded ingenuity of intricate colour themes. The main entrance affords an instance—one of many. A reproduction of the doorway under the north porch of the Erechtheion, the transposition is so faithful that even the late Byzantine door-jambs are repeated—being apparently accepted in all sincerity as part of the original design. Yet under its polychromatic cloak the blunder is not readily recognised.

But where as impurity of form on a small scale is rendered less obvious and offensive by the studied employment of colour, precisely the converse is true in the case of larger features. Thus the unfortunate window piers are given an extravagant emphasis by a colour treatment no harsher than that adopted throughout for the detail of the building.

A real danger lies in the possible tendency the adoption of such a process of enrichment may have to subordinate the instinct for absolute form and its arrangement to the pursuit of colour effect, and so destroy the most vital and essential quality of architectural expression. To the genius of the Vth century, Athenian architects, backed by artisans whose sense of mass and line was as certain and as subtle as their own, and who had inherited and perfected an incomparable technique, the polychromatic ornamentation of structures presented no perils. It was a process contributing only to the beauty of the architecture. Few colours were employed, but through a fine adjustment of tone and contrast the most splendid and brilliant results were obtained. Under modern conditions the attainment of such a level is practically impossible. Even in architects of distinction the requisite mental faculty is rare enough, and the technical tradition, equally necessary, has been dead nearly two thousand years. A Hansen or an Alexander Thomson many from time to time make a courageous effort to revive the beauties of the art, but their success is individual, and leads to the formation of no real school. Their imitators in general achieve little else than a vicious gaudiness or an anæmic negativity, and in neither is the force or delicacy of the architecture assisted. Attention is merely diverted from the structural composition to the arrangement of the colour and its relative values and total effect. The degradation of architecture as a frame for sculpture is not more complete than in its use as a canvas for the distribution of colour.

In North Europe the possibilities of development in the polychromatic treatment of design are by the exigencies of climate confined to interior work. Even in small external details this rule is valid. (The splashes of gilt and red which distinguish the capitals of the Ionic colonnade to Schinkel's Altes Museum in Berlin, though intended to echo the mosaics on the inner wall, serve rather to create an impertinent interruption in the dark austerity of the building, on whose larger surfaces the weather will not permit the application of colour.) Excluding the use of ceramic tiles and the actual difference in the hues of the materials, architecture must be with us monotone.

Both of what we gain and of what we lose by the restriction the Museo Barracco may be fairly regarded as an indicative example.


EXAMPLES
OF
POLYCHROMATIC TREATMENT
OF DETAIL
MVSEO BARRACCO · ROME
CAP OF WINDOW PIER
DETAIL OF FRET ON BAND UNDER WINDOW PIER
CAPITAL OF PILASTER MAIN ORDER
ARCHITRAVE OF MAIN ENTABLATVRE
CORNICE OF MAIN ENTABLATVRE
DETAIL OF LIONS HEAD & ANTHEMION ON CORNICE MAIN ENTABLATVRE
ANGLE ACROTERIA MAIN CORNICE
COLOVR INDEX : WHITE RED YELLOW BLVE
C 2

ARCHITECTURAL SOCIETIES.

Royal Institute of the Architects of Ireland.

An ordinary meeting of the Council of the above body was held on the 4th inst., at 31, South Frederick-street, Dublin. Mr. W. Kaye-Parry, F.R.I.B.A., was in the chair, and there were also present:—Messrs. F. Hayes, H. Allberry, A. G. C. Millar, F. G. Hicks, G. P. Sheridan, Lucius O'Callaghan, G. C. Ashlin, and C. A. Owen, Hon. Secretary.

The minutes of the ordinary meeting of June 12 and of the special meeting of July 26 were read and signed, and a large amount of correspondence dealt with, including applications for admission to studentship. A report from the Professional Practice Committee in reference to a proposed revision of the schedule of charges was approved and adopted. A vote of condolence with the family of the late Mr. W. H. Hill, of Cork, was passed.

COMPETITION NEWS.

Railway Staircase at Marseilles.

A competition, limited to architects practising in Marseilles, has taken place with the object of obtaining a design for a monumental staircase giving access to the Saint-Charles Station at Marseilles. The first premium of 120*l.* has been awarded to MM. Eugène Sénès and Léon Arnal, whose design, remarkable for its simplicity, is a flight of steps continuing in a straight line the Boulevard d'Athènes. At the sides of the imposing staircase are lions, bronze candelabra, and groups symbolical of the commerce of the city; and the whole conception is dignified and effective. The second prize, 60*l.*, went to MM. André Ramasso and Edouard Rambert, and M. Etienne Bentz received the remaining 20*l.*

Proposed Statue in Havana.

H.M. Legation at Havana report that a competition has been opened by the Cuban Government for the erection at Havana of an equestrian statue of the Cuban General Maceo. Plaster models should be sent by sculptors desirous of competing to the "Comisión Ejecutiva, Monumento al General Antonio Maceo, Secretaría de Instrucción Pública y Bellas Artes," Havana, before January 20, 1912. The sum of 100,000 pesos (about 20,600*l.*) has been voted for the work. British sculptors proposing to compete should first put themselves into communication with the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C., where also further particulars (in Spanish) may be seen.

GENERAL NEWS.

Official Delegates to the Architectural Congress.

The following Official Delegates are attending the International Congress of Architects at Rome next month:—H.M. Government will be represented by Sir Henry Tanner, I.S.O., C.B., F.R.I.B.A., of H.M. Office of Works; the London County Council by Mr. W. Edward Riley, F.R.I.B.A., A.M.Inst.C.E., R.B.A., Superintending Architect, London County Council; the R.I.B.A. by Mr. Leonard Stokes, President, R.I.B.A.; Mr. John W. Simpson, Vice-President, R.I.B.A., Secretaire Comité Permanent International des Architectes; Mr. John Belcher, R.A., F.R.I.B.A., Vice-President of the Comité Permanent International des Architectes; and Mr. John J. Burnet, LL.D., A.R.S.A., F.R.I.B.A. The Liverpool Architectural Society is sending Mr. Arnold Thornely, F.R.I.B.A., the President of the Society; the Devon and Exeter Architectural Society, Mr. James Jerman, F.R.I.B.A., the President of this Society: the Dundee Institute of Architects, Mr. W. Fleming Wilkie, F.R.I.B.A., President of the Dundee Institute; the Manchester Society of Architects, Mr. Percy S. Worthington, F.R.I.B.A.; and the British Fire Prevention Committee, Mr. Edwin O. Sachs, F.R.I.B.A., Chairman of the Committee.

Science Museum.

Mr. Francis Grant Ogilvie, C.B., LL.D., Secretary for the Science Museum and Geological Survey and Museum, has been appointed Director of the Science Museum. Mr. Ogilvie graduated as B.Sc., Edinburgh; he was Director of the Edinburgh Museum of Science and Art, 1900-3, and Principal Assistant Secretary, Board of Education, 1903-10.

Ordnance Survey.

Lieut.-Colonel C. F. Close, C.M.G., R.E., has been appointed Director-General of the Ordnance Survey in succession to Colonel S. C. N. Grant, C.M.G., R.E.

Huddersfield Memorials to King Edward VII.

Mr. P. Bryant Baker is at work on a bronze statue of King Edward, which will be erected in Huddersfield. The late King will be represented in his Garter robes, and there will be emblematic bronze tablets. Apart from the statue, a sum of 24,000*l.* has been subscribed to endow a wing in the Royal Infirmary.

King Edward VII. Memorial, Newmarket.

Sir Ernest Cassel has acquired and has presented to the Newmarket Urban District Council, the Grafton House property in High and Fitzroy streets. The property, extending over 2½ acres, belonged to the late King, and will be preserved as an open space dedicated to his memory.

British Museum: Report for 1910.

In his annual report upon the general progress at the Museum, in Bloomsbury, Dr. Kenyon states that the total number of visitors in 1910 was 739,837, as compared with 708,836 in 1909, and the number of visits by readers to the Reading Room was 219,274, an increase of 1,300 and the third highest recorded, the daily average being 726. The report refers to the purchase of a large collection of the late Sir Francis S. Haden's etchings, and of the Wegener collection of ancient Chinese paintings, to the Salting bequest of prints and drawings, and to the acquisition of the stone sarcophagus of Qem-Ptah, 200 B.C., from Memphis, decorated, both within and without, with figures of the gods of the dead and scenes and texts of the Am-Tuat, or guide to the after world. The number of visits made by the public to the Natural History Museum was 515,562, a decrease of 19,554 as compared with the preceding year.

A Proposed New Art Gallery for London.

Negotiations are in progress for the purchase of premises in Old Bond-street as a gallery for the exhibition of works by members of the junior art clubs and societies. The premises stand on the east side of the street, and comprise what in the early years of last century was known as the Western Exchange; there is a rare coloured print of the spacious showrooms in the (old) Gardner Collection.

The London Museum.

Mr. J. Seymour Lucas, R.A., has been known for many years as a collector of ancient costumes, many of which have been introduced from time to time into the romantic pictures of this popular artist. Mr. Lucas has been persuaded to sell his collection to the London Museum, where they will be seen to advantage in a few months' time.

A Patents Exhibition.

Steps are being taken for the establishment in London of a permanent exhibition of current patents, to which the public will have free access, and where they will be conducted through the different sections by expert demonstrators and salesmen.

Carnegie Libraries for Manchester.

The Free Libraries Committee of Manchester have recommended the City Council to accept an offer made by Mr. Andrew Carnegie to provide 15,000*l.* for the purpose of erecting branch libraries in the suburbs of the city. If the report is adopted, it is probable that sites will be chosen in Withington, Chorlton-cum-Hardy, and Didsbury.

St. Andrews University.

At the forthcoming celebration of the 500th anniversary of the foundation of the University, the Senatus Academicus will confer the honorary degree of LL.D. upon Lord Balcarres, M.P., Sir George Frampton, R.A., Dr. Kenyon, Director and Principal Librarian, British Museum; Colonel Prain, F.R.S., Director, Kew Gardens; Dr.

Chimneypiece in the Great Hall, Charterhouse.
From Mr. Godfrey's "A History of Architecture in London." (Mr. B. T. Batsford.)

Teall, Director, H.M. Geological Survey; Dr. Watts, F.R.S., Professor of Geology, Imperial College of Science; and Dr. Woodward, F.R.S., Keeper, Geological Department, British Museum.

The Trades' Training Schools.

The classes of the Trades' Training Schools, 153, Great Tichfield-street will reopen on September 11. Full particulars may be obtained from Mr. H. Phillips Fletcher, F.R.I.B.A., the Director. The Schools, which are under the jurisdiction of the Worshipful Companies of Carpenters, Joiners, Painter-Stainers, Plasterers, Tylers and Bricklayers, and Wheelwrights, provide instruction for those engaged in the various trades; the advantages of obtaining skilled tuition at nominal fees should induce every apprentice and workman to join the class for which he is eligible.

Westminster Abbey.

The work of restoring Westminster Abbey to its normal appearance has been completed by the Office of Works. Electric lighting, which was installed for the Coronation, is now in use.

Auctioneers' Institute of the United Kingdom.

By invitation of the Hants, Wilts, and Dorset Branch, the annual country meeting of the Institute will be held on September 14-5 at Portsmouth, under the presidency of Mr. John Marks, of Messrs. Orgill, Marks, & Barley. The Council will hold their autumn meeting on September 14 in the Town Hall; on the following two days visits will be paid to Chichester, Southampton, and the Isle of Wight.

Timber Cottages.

The Local Government Board has notified the Billericay Rural District Council that it will be prepared to consider proposals that timber-built cottages should be built for the use of workmen. It appears that there is some overcrowding in the district, the cause being, according to a local Councillor, the settling of so many London pensioners and tradesmen.

The Bridge Collection.

Mrs. E. E. Bridge, of Manor House, Piddletrenthide, Dorsetshire, is about to dispose of a collection of relics and works of art formed by J. Bridge and J. Gawler Bridge, members of the firm of Rundell & Bridge, of No. 32, Ludgate-hill, crown jewellers and goldsmiths to George III. and his three successors on the throne. The collection includes some old silver and Sheffield plate, furniture, miniatures, and paintings, statuettes, models, and bronzes by Nollekens, Bailey, Canova, and Flaxman, and what are described as being the wrought-iron railings and scroll lamp-bracket from the former tomb in the choir, Peterborough Cathedral, of Mary, Queen of Scots, and another from the tomb (by Torrigiano, in Westminster Abbey) of the Lady Margaret, Countess of Richmond and Derby, mother of King Henry VII.

French Architecture Abroad.

Since the International Congress at Antwerp French architects have received numerous commissions from foreign places, notably from the American Republics. French professors seem to be in demand, too, in the West, and their presence there is likely to ensure further business relations between the countries. Is it possible that, by the judicious adaptation of British ideas to the requirements elsewhere, our own architects may secure some of the work of the future?

CORRESPONDENCE.

The Road Board.

SIR,—I notice in the last issue of the *Builder* a paragraph *re* the work of the Road Board. As a matter of fact, the Road Board are doing a great deal of very useful work in a very quiet manner, and their means, or rather the means at their disposal, are, as you say, very limited.

There are two aspects of the contribution question. The local authorities have initially the onus of maintaining their own roads, and the Road Board would be wrong in taking this responsibility off their hands, even in individual cases. It would almost become a competition who could make their roads the worst and show the greatest need for assistance. As the applications for assistance exceed the funds of the Board by about six to one, under the circumstances the policy of helping those who help themselves is a sound one. One advantage of the contribution system is that it ensures, at the least possible cost to the Board, their advice in the matter of roadmaking being listened to—a most important matter. The Board have under their personal observation almost every experimental section of road in the kingdom, and it is becoming evident that the old methods of roadmaking (and maintenance also) were so extravagant that in a few years the annual saving from the improvements effected by the spreading of better information and the experimentally-established improved methods will represent so great a sum as to constitute in itself a potential fund by which the other more obviously-needed improvements can be carried out. It is a fact that an ordinary country road can be surfaced with macadam at about 1s. 4d. per square yard, with an extra 4d. a yard for tarring, total 1s. 8d., as against such figures as 2s. 4d. to 4s. often expended under identical conditions with no better results.

The position of the Road Board is that of a consultant called in to manage a badly-managed business; his first job is to cut down all extravagant and useless expenditure and add the savings so effected to his other resources for the ultimate improvement of the position. It is obviously bad management to spend money in building and maintaining new roads and extensions before the best method of road building and maintenance has been settled.

I believe that it is now ascertained that a road suitably built and with a waterproof surface, *i.e.*, tarred, is, so far as rubber-tyred traffic (and nearly all motor traffic is rubber tyred) almost a permanent job. I have heard that forty or fifty years is its estimated life. It is the horse vehicles and iron-tyred vehicles, including traction engines, that knock such a road to pieces, but even under average conditions the durability of roads under the ægis of the Road Board is being enormously increased.

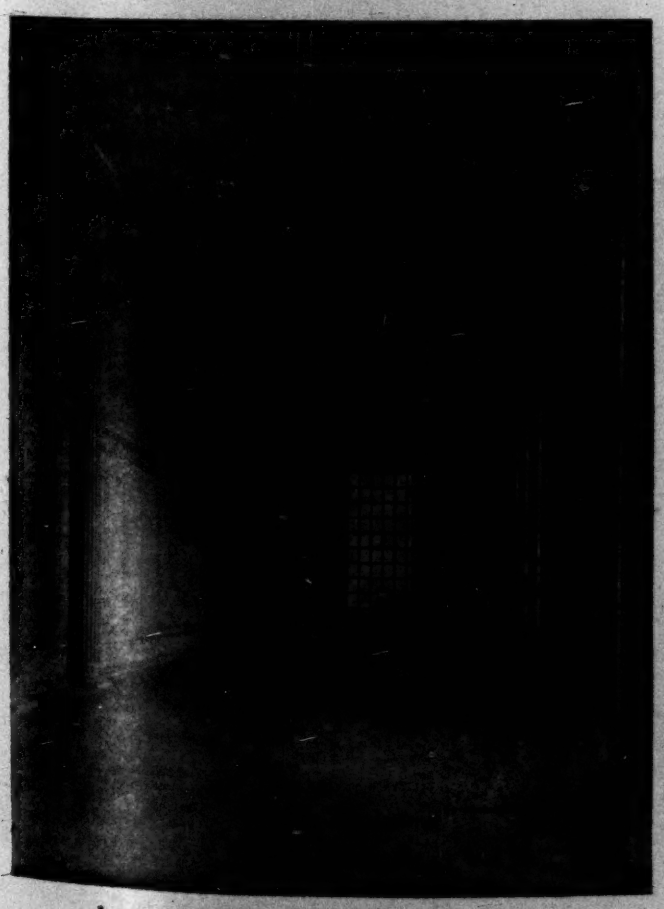
With the colossal sums to be saved by proper construction being annually lost—irretrievably lost—it seems to me that there is no question as to the wisdom of the present line of action, and I think it is deplorable that the Press should take the superficial view they do as to the field for the activity of the Road Board.

F. W. L.

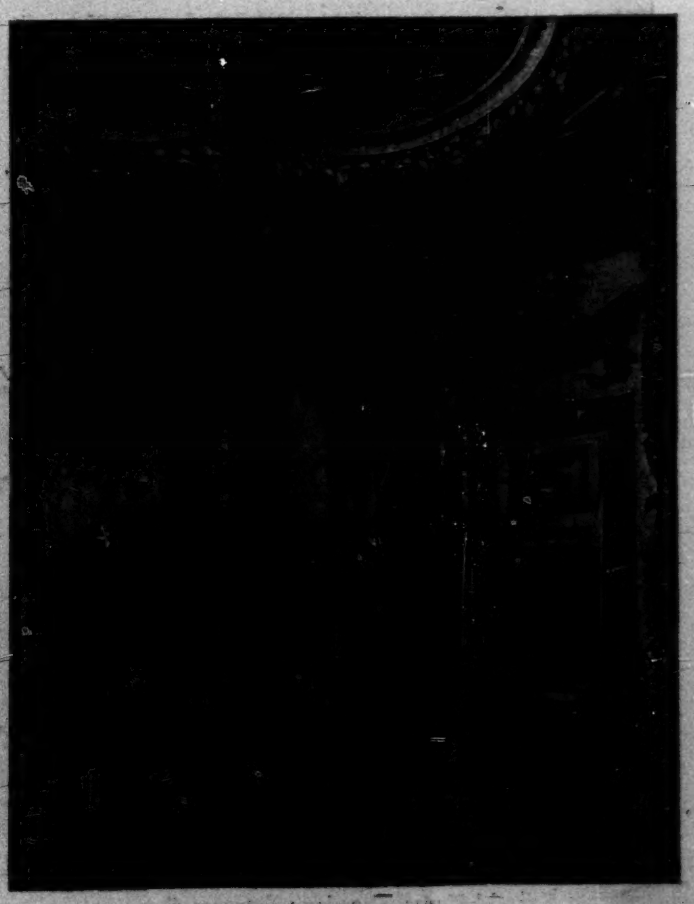
BOOKS.

A History of Architecture in London. By WALTER H. GODFREY. With 250 illustrations, maps, and lists of buildings. (B. T. Batsford. 7s. 6d.)

SINCE the time of Stow books on London have multiplied so rapidly that the fountain



Interior, The Orangery, Kensington Palace.



Vestry, St. Lawrence Jewry.

(From Mr. Godfrey's "A History of Architecture in London" (Mr. B. T. Batsford.)

of knowledge on the subject would have run dry but for the fact that something new can be said always about the past of a great city. During the centuries which have elapsed since the first encampment on the banks of the Thames the British race has shared enormously in the progress of the world, and while much has been given in the way of enterprise, much of artistic importance has been derived from other countries. The capital city of the Empire reflects, of course, changes in thought and the application of ideas; so the London of to-day may be likened to a vast museum containing evidence of almost every variety of artistic influence. In one decade there will be brought to light some early British or Roman remains which will alter or confirm the opinions of archæologists; in another decade will arise such a building as the Byzantine Cathedral at Westminster to bring to Londoners the possibilities of an hitherto unrepresented style of architecture.

Such things would only appeal to the limited few if it were not for the guidance of those who devote time and energy to the task of explanation. London has been fortunate in its interpreters, and whether we read the whole-hearted phrases of Johnson, the incidental eulogies of Lamb, the systematic analyses of Besant, or inspired dissertations by such brilliant essayists as Mr. Henry James and Mr. Austin Dobson, we are conscious of the exceptional attractiveness which London possesses. If, however, we wish to penetrate intelligently into the architectural history of the Metropolis we may be pardoned if we choose as cicerone not a man of letters, but an architect well versed in the material side of the subject.

Mr. Godfrey has brought knowledge and enthusiasm to his work, and he has diligently set down the very facts required by those who would learn or recapitulate. Wisely, he introduces his chapters with a glance at the remains of Grecian and Roman buildings, for "within a radius of a few miles of Bloomsbury lie enough examples of the work of past ages to afford a glimpse into the continuous history of architecture from 500 B.C. to A.D. 1900." and the general reader must be given an insight into the essentials of Classic architecture. The British Museum and South Kensington are rich in relics not only of Old London, such as the front of Sir Paul Pindar's house, once in Bishopsgate, and the panelled room from Clifford's Inn, but contain objects of extreme value and interest of other countries, of ancient days. Some early historical notes, therefore, are of importance in the story of London's architecture.

Norman architecture in London, illustrated by the Keep of the Tower and by the Temple Church, is the real beginning of the book, and from that period to the XIXth century Mr. Godfrey is the able guide who introduces us to the things we might pass by, perhaps, in ignorance—a hooded doorway here, a fine staircase there, each with its message of design, brings forward the richness of London in the details of architecture.

The book is addressed partly to a popular audience, and it fulfils its purpose admirably. There are occasional notes on construction, however, which will be of service to architects.

Mr. Godfrey has not hesitated to go outside the radius of London for illustrations. For instance, he includes Hampton Court, Waltham Cross, and Eltham Palace. Generally, however, the examples chosen are all within easy reach of the pedestrian, and no more profitable hours could be spent than those devoted to the examination of the buildings and decorations referred to by the author.

BOOK RECEIVED.

THE CATHEDRALS OF CENTRAL ITALY. By T. Francis Bumpus. With 51 illustrations. (London: T. Werner Laurie. 16s. net.)

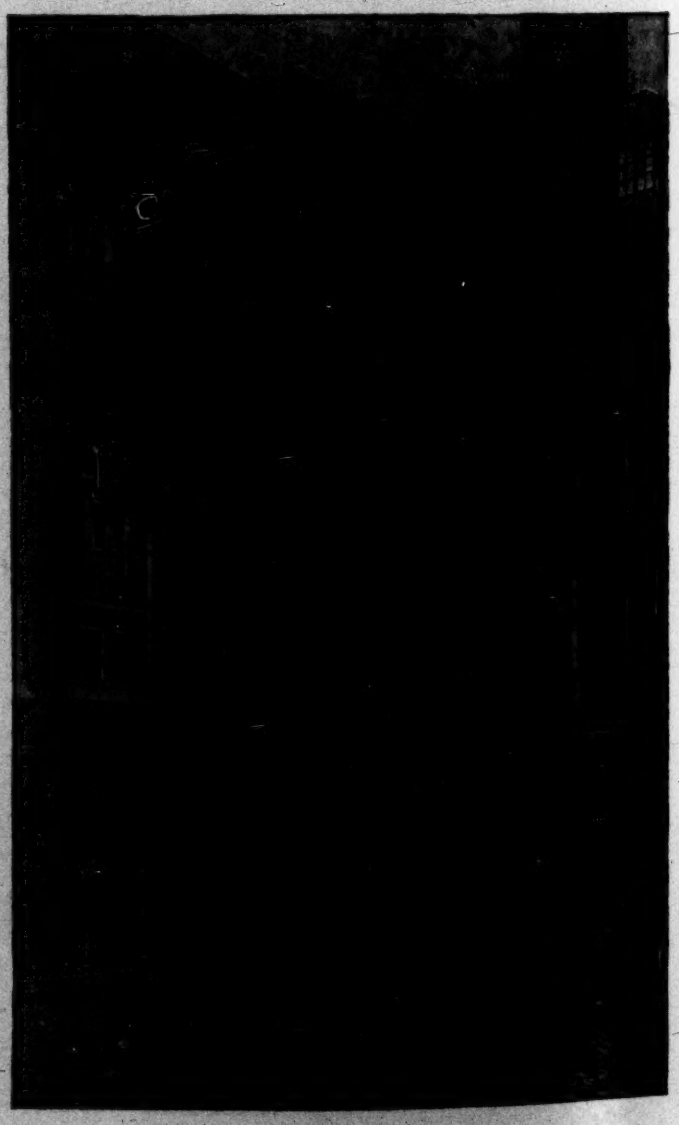
FIFTY YEARS AGO.

From the *Builder* of September 7, 1861.

St. Mary Redcliffe, Bristol.

THE restoration of this noble church proceeds steadily and satisfactorily, though slowly, and more show is now made by comparatively small expenditure than was at first the case. Amongst those who have interested themselves in distinct portions of the work, the Freemasons of the city of Bristol had undertaken the restoration of the north-east corner of the Lady Chapel, and on the 28th ult. a grand assemblage of the brethren took place on the occasion of laying the last stone of the part completed by them. They met, to the number of 500, in the Exchange (Wood's fine building), and marched thence in full dress, with banners and music, to the church, where a choral service was performed and a sermon was preached by the Rev. Brother Watson, Provincial Grand Chaplain, the church being crowded. The procession was then reformed, and proceeded to the outside of the east end of the church, where the stone was laid with Masonic ceremony.

Friends' House, Croydon: Entrance Doorway.



The George Inn, Southwark.

From Mr. Godfrey's "A History of Architecture in London." (Mr. B. T. Batsford.)

EDITORIAL SUMMARY.

The suggestions drawn up by the Royal Institute of British Architects as a result of the Town Planning Conference last year form the subject of the leading article: "Civics and the Architect."

In the following article (p. 264) reference is made to the Blue Book recently issued on the "Census of Production" (1907).

Notes (p. 265) include: "Architecture for the Masses"; "The Natural History and New Science Museums"; "St. George's Barracks"; "Rural Housing."

In his fifth article on "The Story of the Bridge" (p. 265) Mr. Shaw Sparrow traces the evolution of the timber bridge. Examples of constructive carpentry, in which mechanics and fine art were allied, are described.

Mr. Budden gives the history of "The Museo Barracco, Rome" (p. 268), an interesting modern example of polychromatic decoration in architecture.

Under Correspondence (p. 271) will be found a letter on the work of the Road Board.

Mr. Godfrey's book on "A History of Architecture in London" is reviewed on p. 271.

Details of the Stockport Police Courts Competition appear on p. 273, and other competition news is given on p. 270.

The Monthly Review of Construction opens with a note on the "Second Report of the Joint Committee on Reinforced Concrete" (p. 275). This is followed by "Some Continental Ideas of Slating" (p. 276), and Notes.

In the Building Trade Section (p. 281) are notes on "Recent Workmen's Compensation Cases," "Increment Value," "Concrete Plant for Cold Weather," "Changes in Rates of Wages," "An Indian Mortar Mill," "Labour Disputes," and General Building News.

On p. 284 are illustrations of new buildings in connexion with the Hackney Union Infirmary, and an article on "The Royal Commission on Sewage Disposal."

MEETINGS.

FRIDAY, SEPTEMBER 8.

Institution of Municipal Engineers at Leeds.—Victoria, 9.45; London Bridge, 9.50; Phœnix Ironworks, 11.0. At 3.10 leave for Seaford, where Air Compressing Station, Ejectors, and Refuse Destructor House, under construction, will be shown.

MONDAY, SEPTEMBER 11.

The Incorporated Clerks of Works' Association (Carpenters' Hall, London-wall).—Paper by Mr. C. S. Willis on "Hampton Court: its Architecture and Associations." 8 p.m.

STOCKPORT POLICE COURTS COMPETITION.

THE result of this competition and the assessor's report were given in our issue of August 25, p. 216.

Professor Reilly adjudicated on the eighteen designs submitted by invited architects from all parts of the country, and the premiums were awarded as follows:—

First—Messrs. J. Theo. Halliday and Claude Paterson, AA.R.I.B.A., of Stockport and Manchester.

Second—Messrs. Appleyard & Quiggin, of Liverpool.

Third—Messrs. Stott & Son, of Stockport and Manchester.

The competition differs in many respects from the ordinary, and reflects indications of much-needed improvements. We welcome, in the first place, a successful design which is based on monumental academic principles. Let us hope that the latent yearning for a more noble civic architecture which has for some time been making itself felt is at length going to bear fruit. Our large buildings have been too long the object of ridicule of American and Continental architects. We need an architecture that is permanent and lasting and Classic, in the true sense of the word, not a mere fashion of the moment that relies on meretricious tricks of draughtsmanship rather than breadth of conception and purity of detail. We have had enough of this paper stuff, enough of these short cuts to notoriety. The younger generation is surfeited with these pseudo-classic forms and ephemeral mannerisms.

There is no denying the influence of the Liverpool School of Architecture in this competition, particularly in the case of the first two designs, while many of the competitors have undoubtedly had its Sketch-Book in their hands. The part that the School has taken in the growth of monumental architecture in this country is too well known to need further comment.

Another new starting-point is a change in draughtsmanship. Instead of the coarse, thick line and blackened windows of recent years, it is gratifying to find a set of drawings of such refined and delicate rendering as that of Messrs. Halliday & Paterson. The elevations and sections are drawn in pencil and shaded. This, in fact, seems the only reasonable way in which to portray monumental architecture, and should, in competitions of this style, become more general.

It is satisfactory for once to find that the winning design is so pre-eminently the best that it leaves no loopholes for the assaults of discontented competitors, and both the assessor and successful authors will be spared the abuse which has been so sadly characteristic of recent competitions.

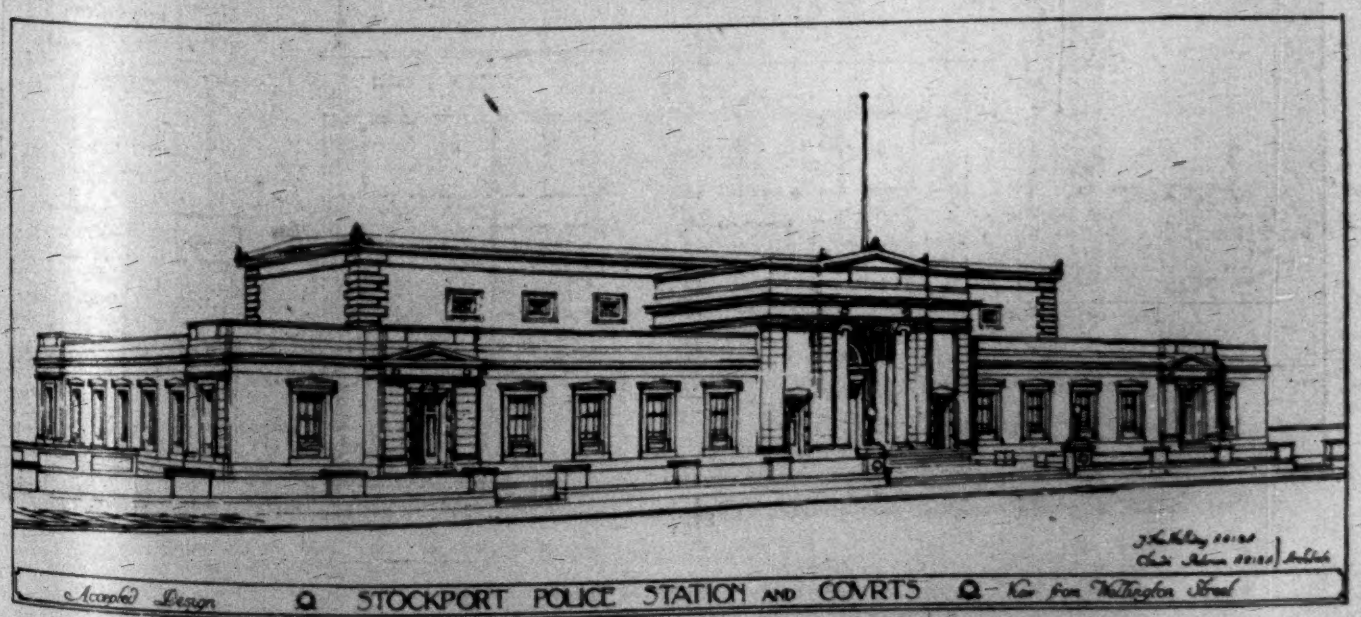
The problem was one of such complexity that only a small number of the competitors can be said to have arrived at a thoroughly satisfactory conclusion. A site of ample area has a frontage to Wellington-street, but the whole of the rear portion is at a depth of 25 ft. below the street level. Only a few of the competitors took full advantage of the architectural possibilities this afforded.

The winning plan is simple, straightforward, and workable. It was unfortunate that the conditions necessitated that the two main courts should vary in size, but, in spite of this, the plan is well balanced. Flanking the spacious entrance-hall are, on the one hand, the rooms for barristers and solicitors, and, on the other, those for witnesses. In one wing is a fine range of rooms for magistrates and jury, with a separate entrance, and in the other the police offices. The children's court is on the upper floor, while the cells are particularly well arranged at the lower level. The back elevation, of which a splendid view will be obtained, is unquestionably the most distinguished feature of the design. At the lower level is the police parade-room, a charming composition of five arches, with window infillings after the Adam manner, and a strongly rusticated central door. Behind this piles up the great central mass, with its fine wall surfaces and the bold line of the crowning cornice. The front elevation is, necessarily, owing to its lesser height, not quite so imposing though quiet and dignified. The central portico is flanked by lower wings, stretching out to the extreme ends, and behind the whole rises up the main mass, containing the courts. The central portico might be distinctly improved, and is the weakest part of the design. The pediment placed on a low attic is rather meaningless, and Doric columns might, considering the purpose of the building, be well substituted for the slender Ionic.

It is surprising that there is no echo in any of the designs of Old Newgate, that supreme example of architectural fitness, the grim, forbidding aspect of its walls having been termed one of the strongest deterrents to crime.

The designs placed second and third were, in comparison with the first, distinctly disappointing, particularly as regards the plans. Messrs. Appleyard & Quiggin's main front had quite a strong monumental feeling, but the ⅛-in. detail was immature, and did not do full justice to the ideas embodied in the small-scale elevation. The design of Messrs. Stott & Son had an ingenious arrangement at the main entrance, whereby two flights of steps led up to the courts and a central flight down to the charge-room. This would involve a somewhat promiscuous mixing of the various elements of society! The ½-in. detail was one of the best drawings in the room, being delicately rendered with pencil and wash.

The names were not attached to the other sets of drawings, so that we can only conjecture as to their authors. Two designs we judged those of Mr. S. B. Russell, and Mr. T. E. Cooper, and we fail to understand why one of these did not receive one of the premiums. The principal defects of an otherwise excellent plan were the extreme meanness of the main entrance, and the fact that some of the cells overlooked the parade-ground. The front elevation was not happy in its proportion, and was rather coarsely drawn, but



the back took good advantage of the possibilities of the site. One design had a scholarly and dignified Doric front, charmingly portrayed, but it was unfortunately marred by a somewhat quixotic magnification of the ventilating flue into a huge shaft (shall we say tower?), which we fail to reconcile with the quiet Greek façade below it.

The main point is that the right scheme has won, and that it will raise the level of architecture in Stockport, and promises to be, in our opinion, the most noteworthy modern building in a town which has promoted quite a large amount of architectural energy of recent years, and we venture to congratulate the Corporation on having secured an unusually fine design.

ILLUSTRATIONS.

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THIS church, dedicated to SS. Mary, Katherine, and All Saints, was connected with a small monastery of the Bonhommes, founded by William of Edington, who preceded William of Wykeham in the Bishopric of Winchester. It was commenced in 1532, and completed in nine years with the exception of the south porch, which was added a century later.

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These drawings by Mr. T. F. W. Grant, A.R.I.B.A., were awarded this year the Measured Drawings Medal and 10*l.* 10*s.* of the Royal Institute of British Architects.

London County Hall.

THE County Hall, with which progress is being slowly but surely made, will attract more attention in the course of next year and thenceforward than it has done up to the present, although the operations of demolishing, excavating, and laying the foundations have not failed to interest passers-by since the work was started. Mr. Ralph Knott hopes that the superstructure will be begun during March, and as the building takes shape day by day citizens and visitors will find something more definite to appreciate or criticise. Meanwhile the river wall presents a formidable appearance. Mr. Leathart's drawing depicts one of the pair of bronze chain supports placed on each of the granite blocks flanking the central projecting portion of the Embankment front. The horses' heads, of which there are four, are slightly varied in design alternately, and have sweeping wings which are skilfully worked to a square measuring 3 ft. 6 in. Mr. Ralph Knott, the architect, is responsible for the design, and Mr. Gilbert Bayes is the sculptor of the supports.

An illustration of the revised design for the County Hall appeared in the *Builder*, September 10, 1910.

The Story of the Bridge.

THE illustrations of Bridges are in connexion with Mr. Shaw Sparrow's fifth article, which begins on p. 265.

King Edward Memorial Hospital, Ealing.

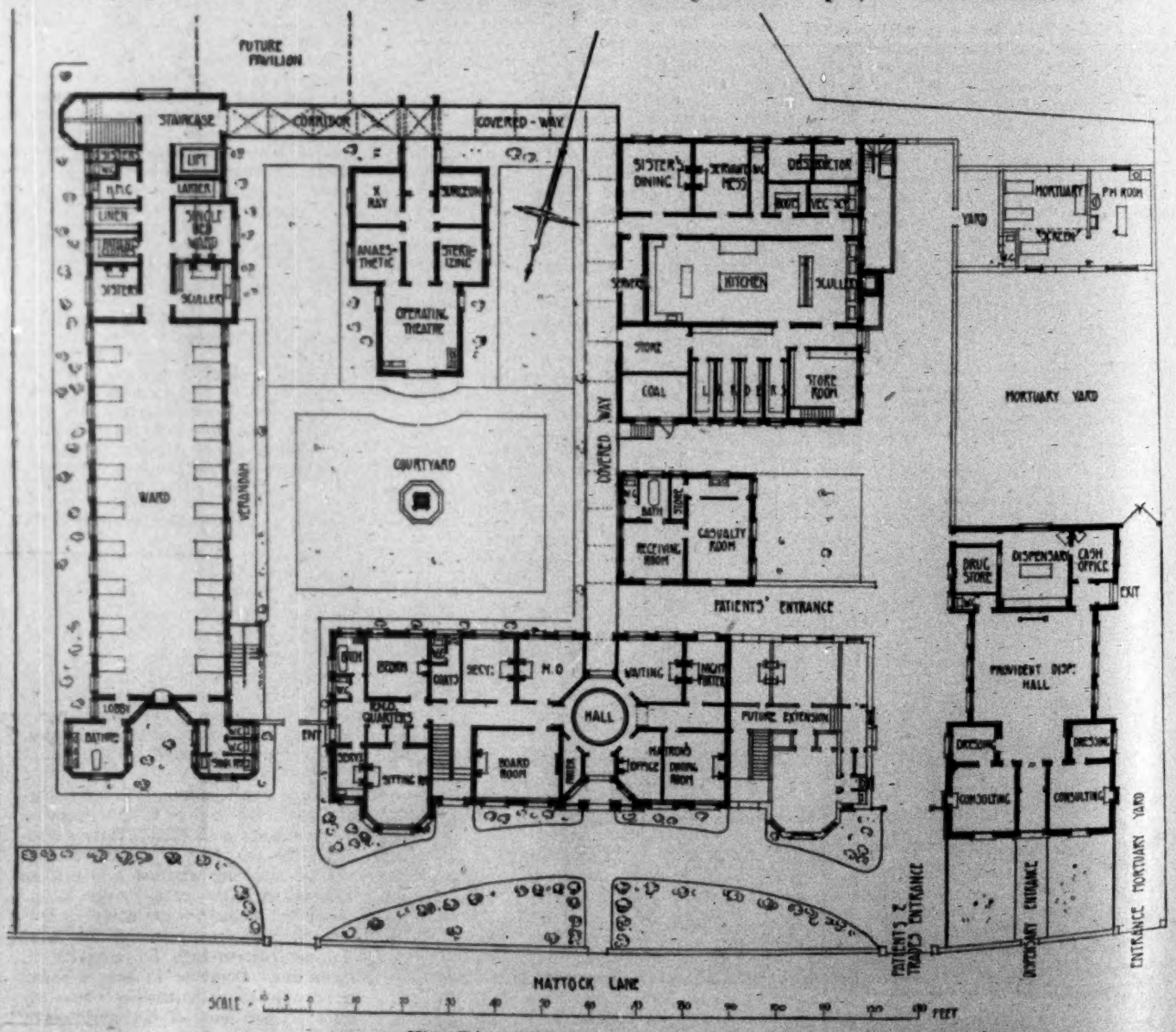
THIS hospital, which was recently opened by H.R.H. Princess Christian, is erected on a site fronting Mattock-lane. The pavilion, which is placed axially north and south, is two stories in height and contains on each floor eighteen beds and one single-bed ward. The operating-theatre adjoins the present and future wards, and is connected thereto by a glazed corridor. The administration block fronts Mattock-lane, and is three stories in height; the upper floors contain recreation-rooms and bedrooms for matron, nurses, and servants. To the south of this block is a small casualty ward and receiving-room, and beyond the kitchen offices, with boiler-house underneath. The several blocks are connected by a covered way, with the exception of the part before mentioned. A small provident dispensary is placed on the western extremity of the site, and behind this a space is reserved for the mortuary.

Provision is made to extend the hospital to accommodate fifty additional patients; this would entail completing the administration block on three floors to the extent shown in outline on plan. The remaining parts of the hospital are designed on a scale sufficient to meet future requirements.

The building was erected at a cost of 17,000*l.* by Mr. Walter Dickens, builder, Ealing, from the designs of Messrs. Hall-Jones & Cummings. The heating and electric lighting were carried out under the supervision of Messrs. Dolby & Williamson.

ROAD REPAIRS.

Visitors to London and residents themselves have not failed to note the inconvenience caused by many roads being "up" for repairs. Not everyone will give a thought to the cause of the trouble, which is, to a large extent, the unusual summer heat. Local authorities, prompted by their Finance Committees, are well aware of the extra expenses incurred, all of which, however, must not be attributed to the effects of the sun this year. For instance, Gloucester-place, which is costing about 4,000*l.* to repair, has provided for a long time a test for springs, tyres, and human endurance.



King Edward Memorial Hospital, Ealing.
Messrs. P. Hall-Jones & Erskine S. Cummings, A.R.I.B.A., Architects.

The operating
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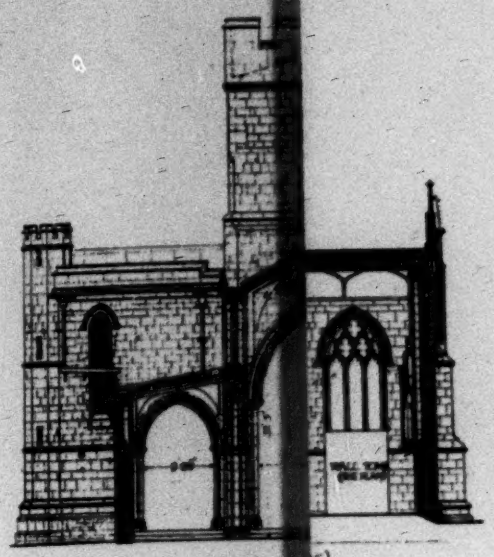

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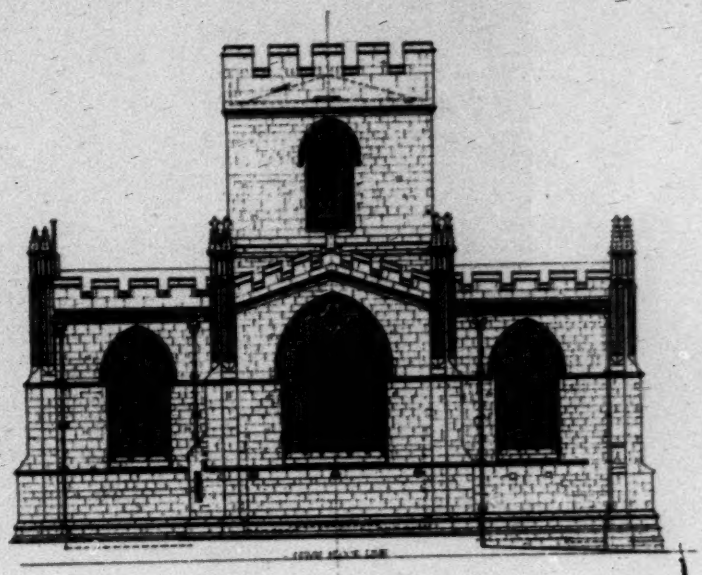
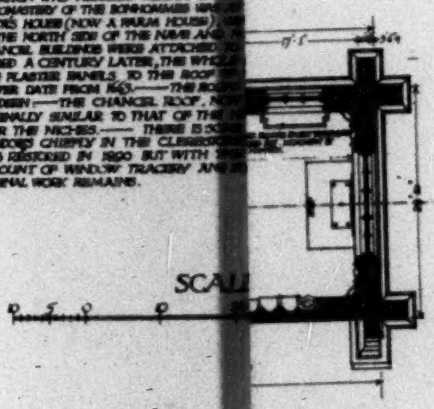
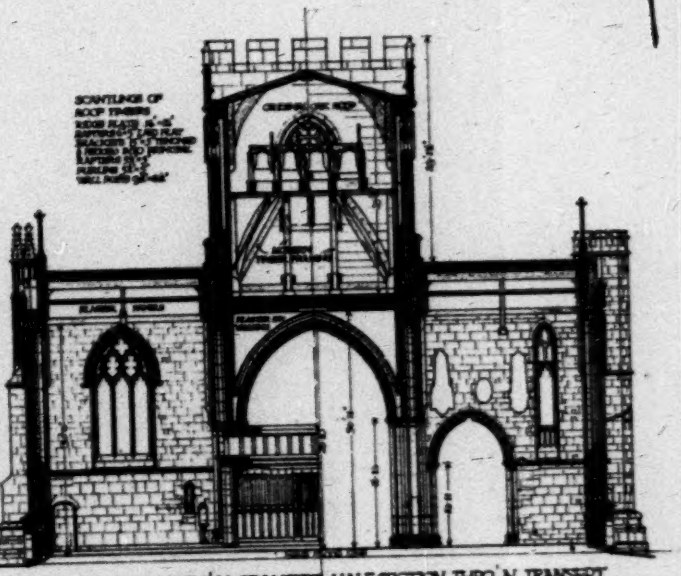


ELEVATION OF EAST END

THIS CHURCH, DEDICATED TO ST. MARY
ERINGTON WHO PRECEDED WILLIAM OF
A MONASTERY OF THE BONHOMMES
FRIARS HOUSE (NOW A FARM HOUSE)
ON THE NORTH SIDE OF THE NAVE AND
CHANCEL BUILDINGS WERE ATTACHED
ADDED A CENTURY LATER, THE WHOLE
THE PLASTER PANELS TO THE ROOF
TOWER DATE FROM 1663. —— THE ROOF
MODERN. —— THE CHANCEL ROOF,
ORIGINALLY SIMILAR TO THAT OF THE
OVER THE NICHES. —— THERE IS
WINDOWS CHIEFLY IN THE CLERESTORY
WAS RESTORED IN 1890 BUT WITH
AMOUNT OF WINDOW TRACERY AND
ORIGINAL WORK REMAINS.



THESE DRAWINGS WERE ALL MADE ON



HALF SECTION THRO' N. TRANSEPT (LOOKING EAST)

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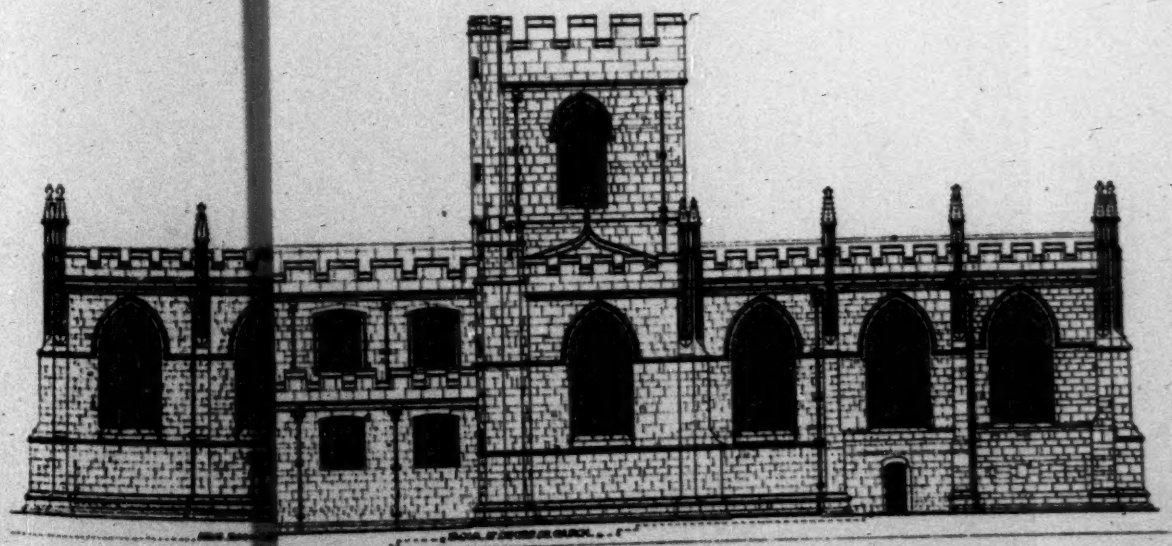

ELEVATION OF SOUTH SIDE

PHOTO LITHO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

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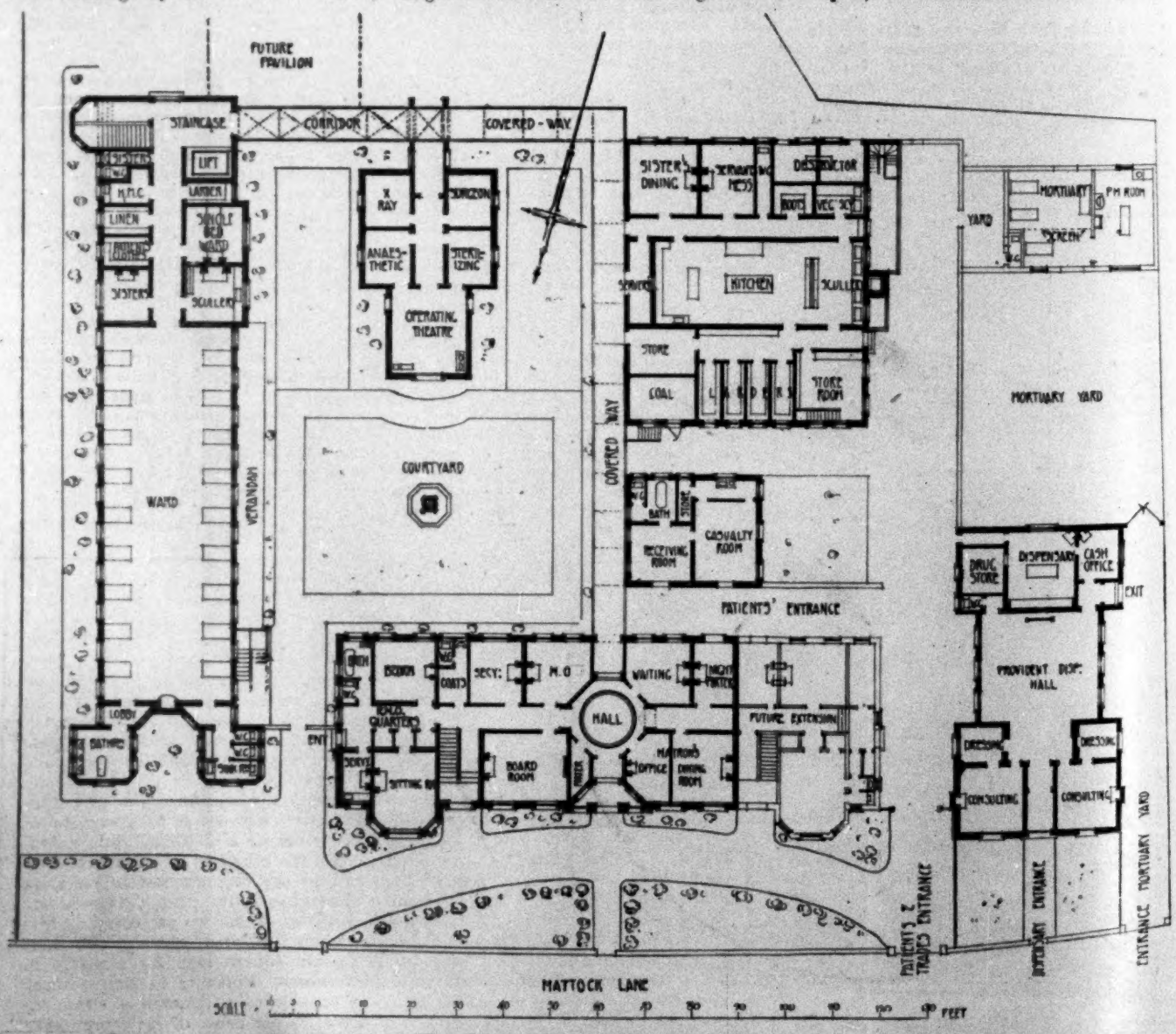
THIS hospital, which was recently opened by H.R.H. Princess Christian, is erected on a site fronting Mattock-lane. The pavilion, which is placed axially north and south, is two stories in height and contains on each floor eighteen beds and one single-bed ward. The operating theatre adjoins the present and future wards, and is connected thereto by a glazed corridor. The administration block fronts Mattock-lane, and is three stories in height; the upper floors contain recreation-rooms and bedrooms for matron, nurses, and servants. To the south of this block is a small casualty ward and receiving-room, and beyond the kitchen offices, with boiler-house underneath. The several blocks are connected by a covered way, with the exception of the part before mentioned. A small provident dispensary is placed on the western extremity of the site, and behind this a space is reserved for the mortuary.

Provision is made to extend the hospital to accommodate fifty additional patients; this would entail completing the administration block on three floors to the extent shown in outline on plan. The remaining parts of the hospital are designed on a scale sufficient to meet future requirements.

The building was erected at a cost of 17,000*l.* by Mr. Walter Dickens, builder, Ealing, from the designs of Messrs. Hall-Jones & Cummings. The heating and electric lighting were carried out under the supervision of Messrs. Dolby & Williamson.

ROAD REPAIRS.

Visitors to London and residents themselves have not failed to note the inconvenience caused by many roads being "up" for repairs. Not everyone will give a thought to the cause of the trouble, which is, to a large extent, the unusual summer heat. Local authorities, prompted by their Finance Committees, are well aware of the extra expenses incurred, all of which, however, must not be attributed to the effects of the sun this year. For instance, Gloucester-place, which is costing about 4,000*l.* to repair, has provided for a long time a test for springs, tyres, and human endurance.



King Edward Memorial Hospital, Ealing.
Messrs. F. Hall-Jones & Erskine S. Cummings, A.R.I.B.A., Architects.

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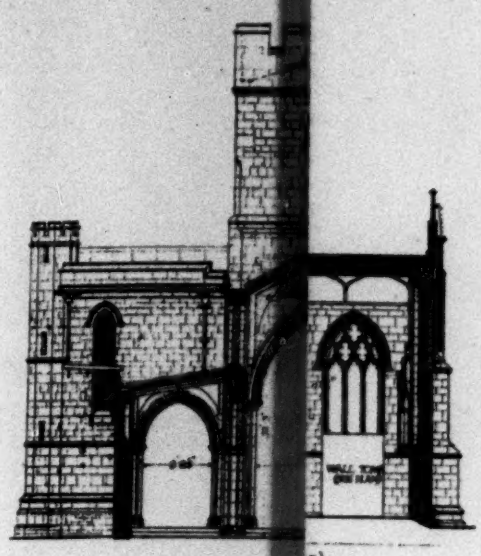

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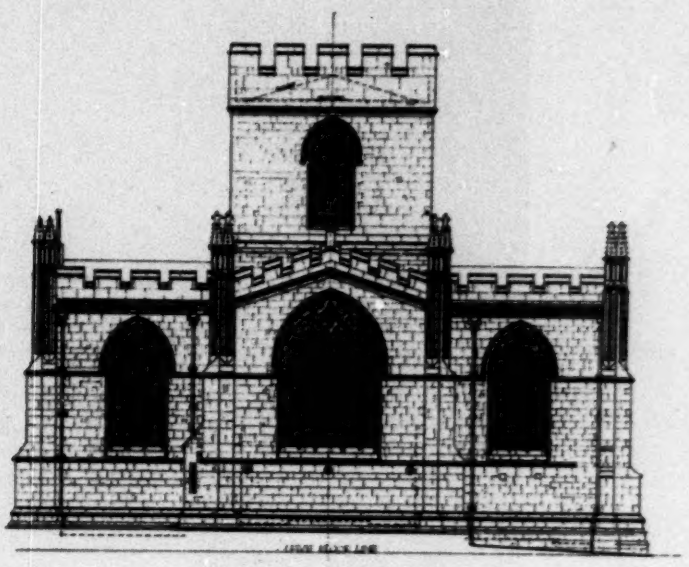
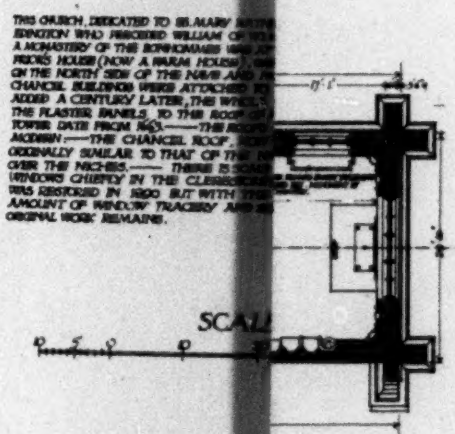


ELEVATION OF EAST END



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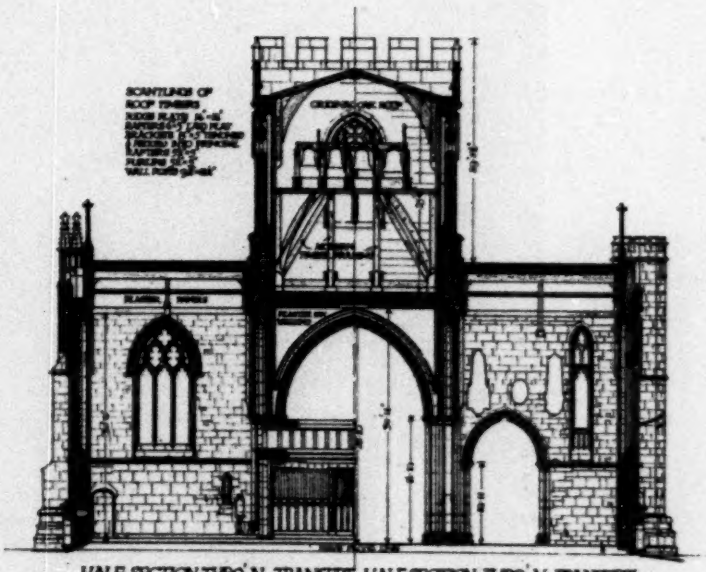

HALF SECTION THRO' N. TRANSEPT (LOOKING EAST)

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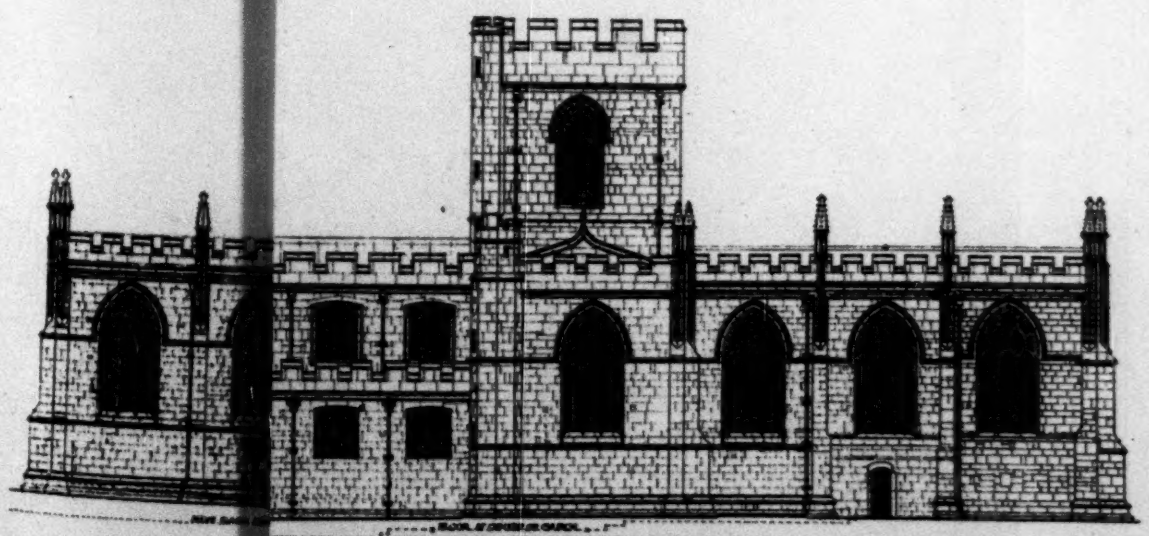

ELEVATION OF SOUTH SIDE

PHOTO LITHO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

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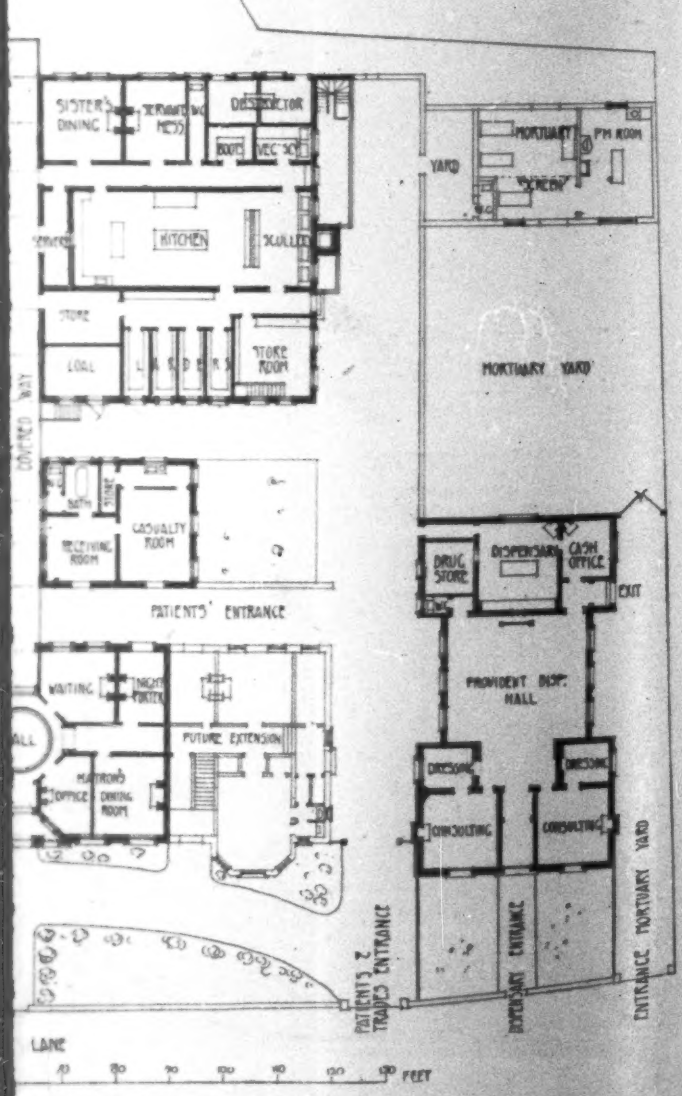

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Cummings, A.R.I.B.A., Architects.

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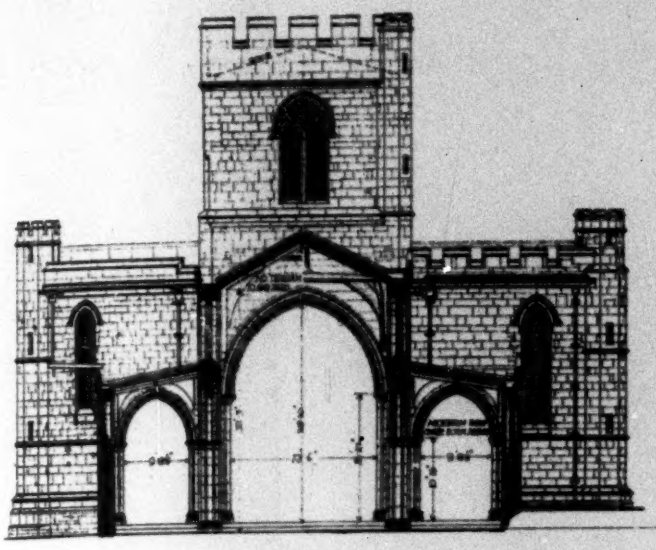

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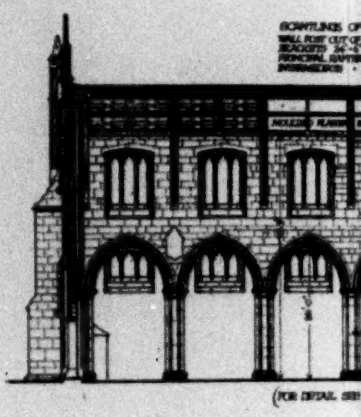

HALF CROSS SECTION THRO' NAVE
(FOR DETAIL OF THIS SEE DRAWING No 2)

THIS CHURCH, DEDICATED TO ST. MARY KATHERINE AND ALL SAINTS, WAS BUILT BY WILLIAM OF EDINGTON WHO FLOURISHED WILLIAM OF WYKEHAM IN THE BISHOPRIC OF WINCHESTER. —— A MONASTERY OF THE BONHOMMES WAS ATTACHED TO THIS CHURCH. BUT OF THIS ONLY THIS PRIOR'S HOUSE (NOW A FARM HOUSE), GARDEN WALLS AND LARGE FISHPONDS REMAIN. ON THE NORTH SIDE OF THE NAVE AND NORTH TRANSEPT AND ON THE SOUTH SIDE OF CHANCEL BUILDINGS WERE ATTACHED TO THE CHURCH. —— EXCEPT FOR THE PORCH, ADDED A CENTURY LATER, THE WHOLE CHURCH WAS BUILT BETWEEN 1352 AND 1361. THE PLASTER PANELS TO THE ROOF OF NAVE AND NORTH TRANSEPT AND UNDER THE TOWER DATE FROM 1633. —— THE ROOFS OF BOTH AISLES AND SOUTH TRANSEPT AND MONKRY —— THE CHANCEL ROOF, NOW A 16TH CENTURY PLASTER CEILING, WAS ORIGINALLY SIMILAR TO THAT OF THE NAVE, THE WALL POSTS RESTING ON THIS CORBELS OVER THE NICHES —— THERE IS SOME ORIGINAL STAINED GLASS IN SOME OF THE WINDOWS CHIEFLY IN THE CLERESTORY AND NORTH TRANSEPT. —— THE CHURCH WAS RESTORED IN 1850 BUT WITH THE EXCEPTION OF A FEW MULLIONS, A SMALL AMOUNT OF WINDOW TRACERY AND SOME RINGING INTERNALLY TO THE CHANCEL THE ORIGINAL WORK REMAINS.

SCALE OF FEET

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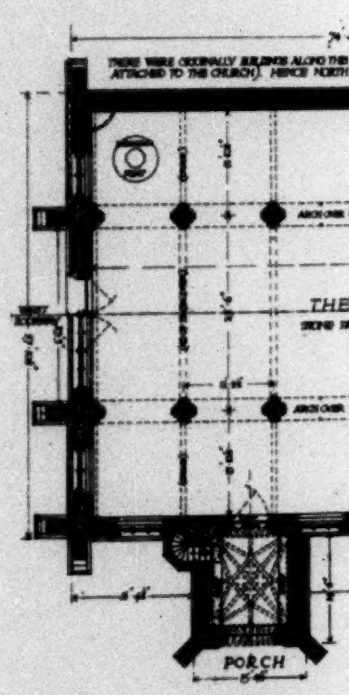

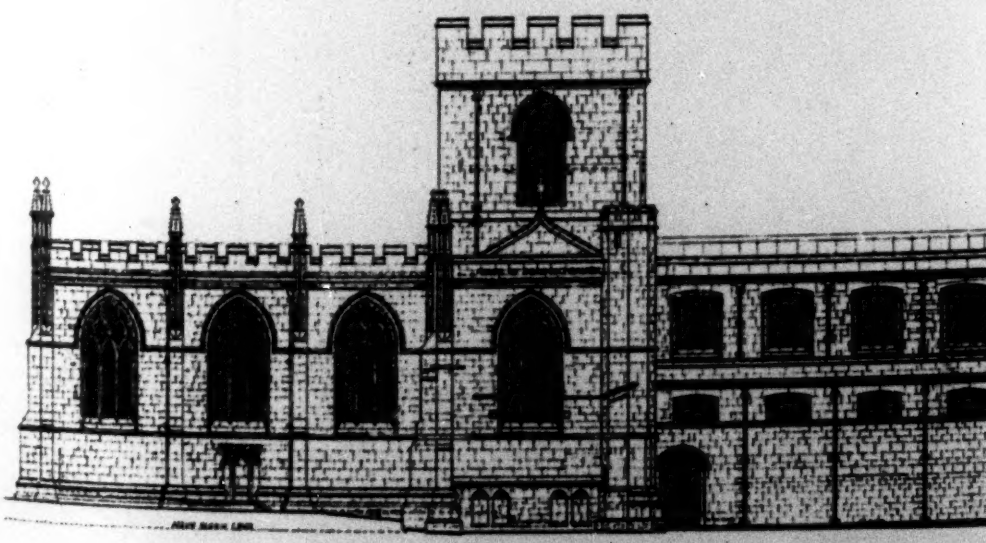

ELEVATION OF NORTH SIDE

R.I.B.A., 1911, *Measured Drawings Medal and £10 10s.*

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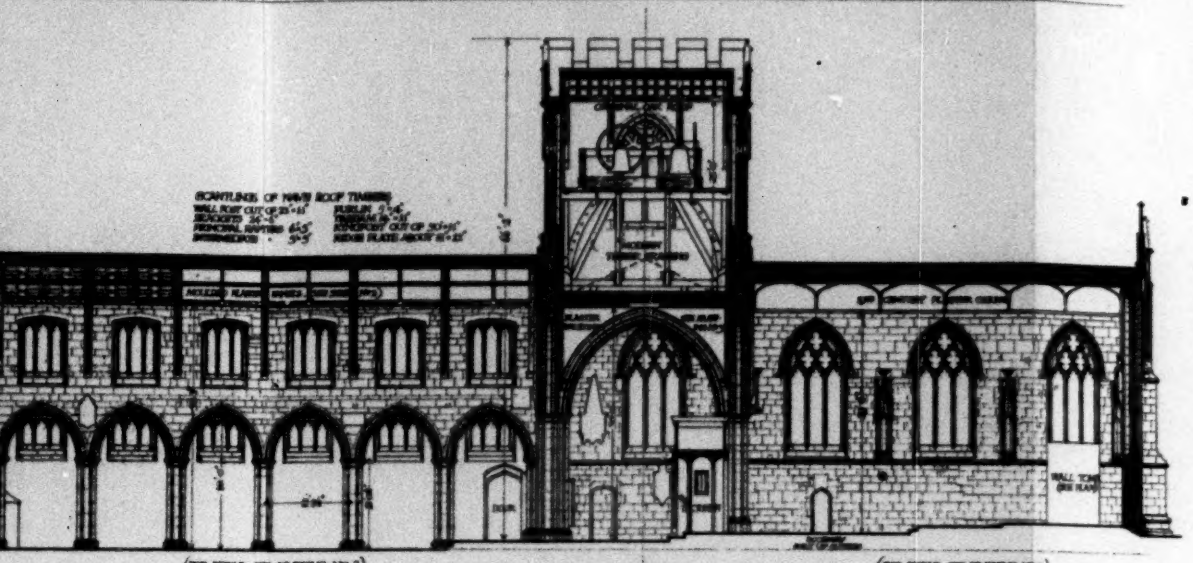
EDINGTON CHURCH, WILTSHIRE.



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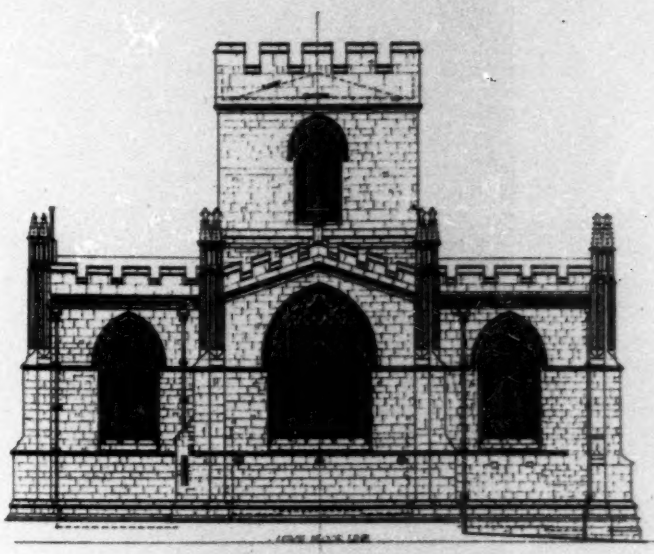

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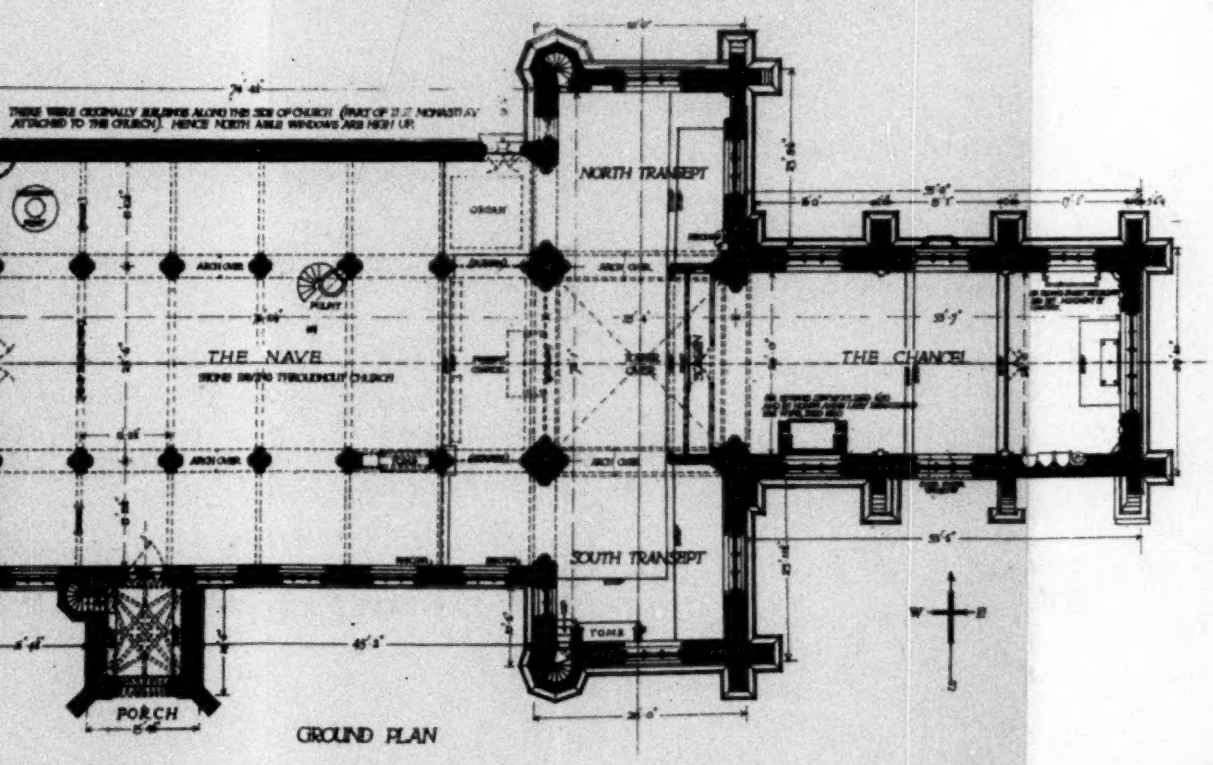
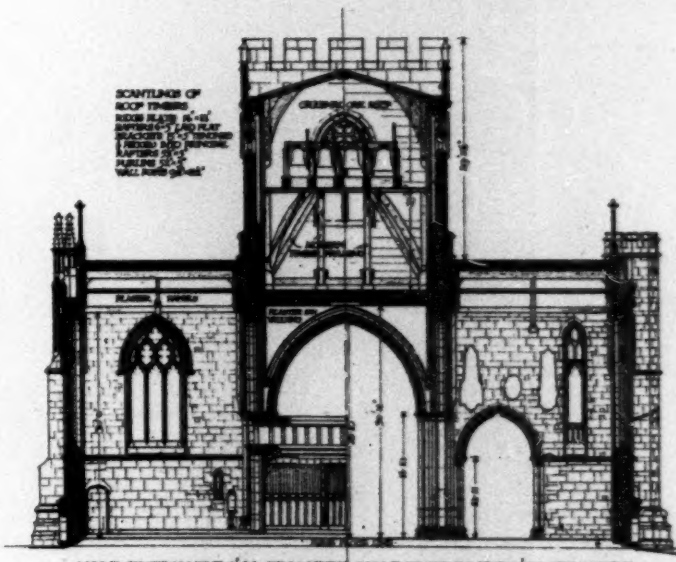


GROUND PLAN



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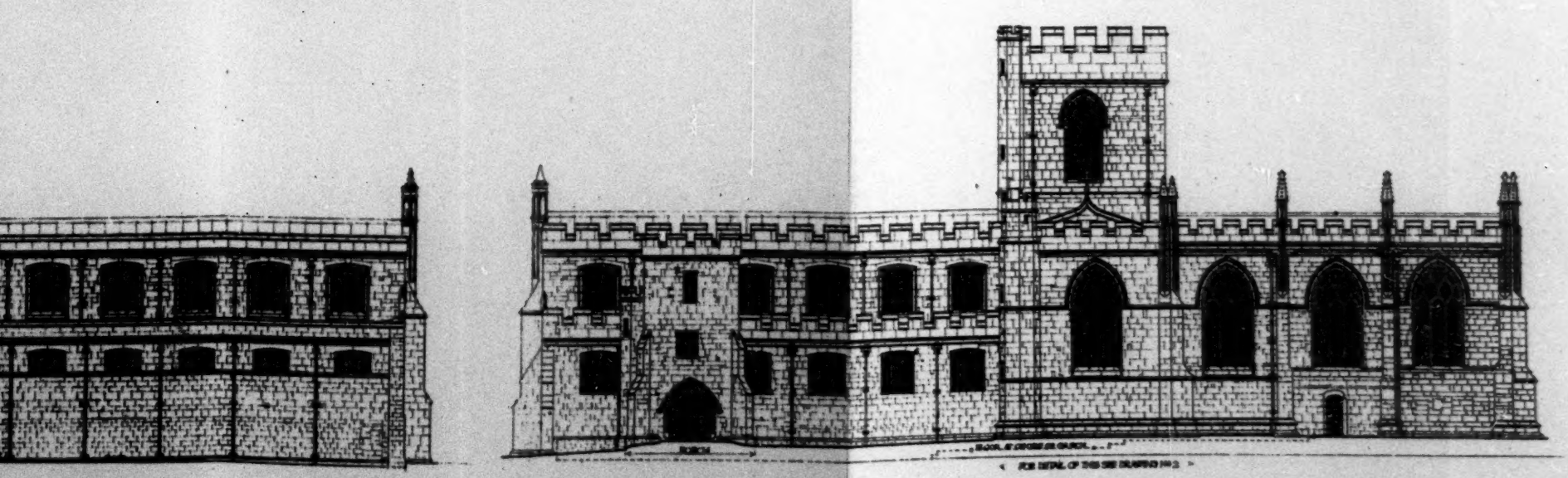

ELEVATION OF SOUTH SIDE

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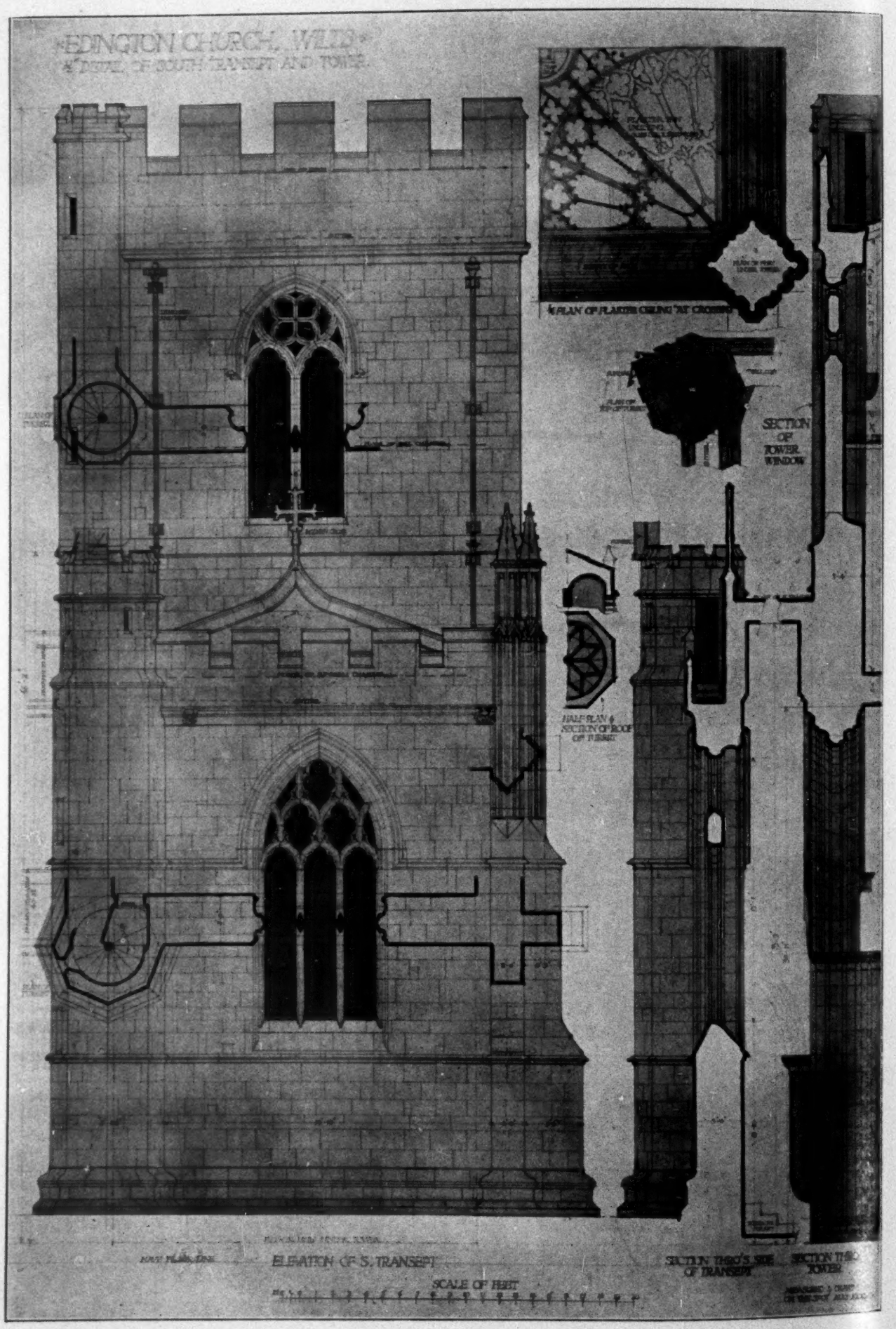
EDINGTON CHURCH, WILTS.—Drawn by Mr. T. F. W. Grant.



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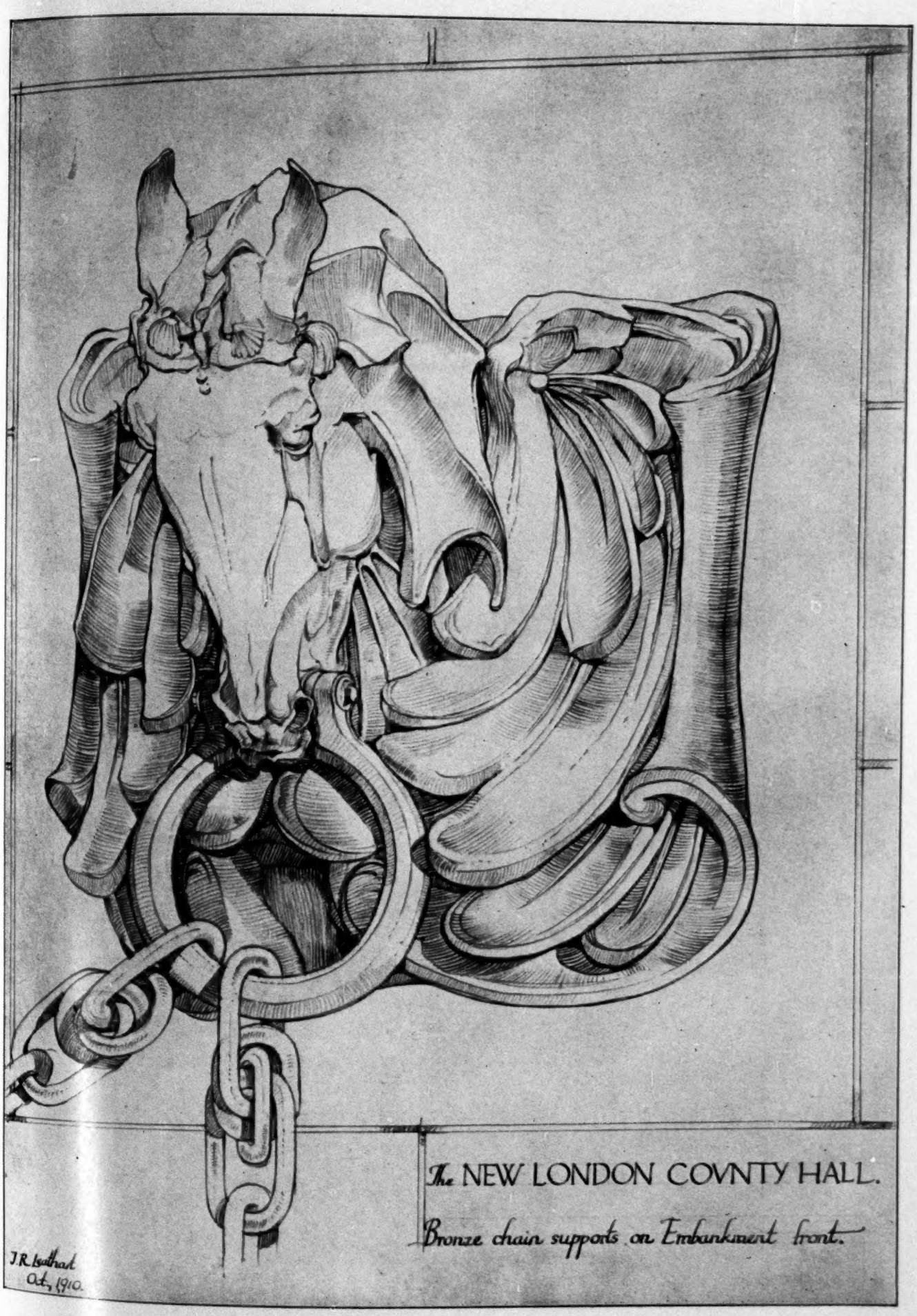

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CHAIN SUPPORTS IN BRONZE.—Mr. Ralph Knott, Architect; Mr. Gilbert Bayes, Sculptor.

Drawn by Mr. J. R. Leathart.

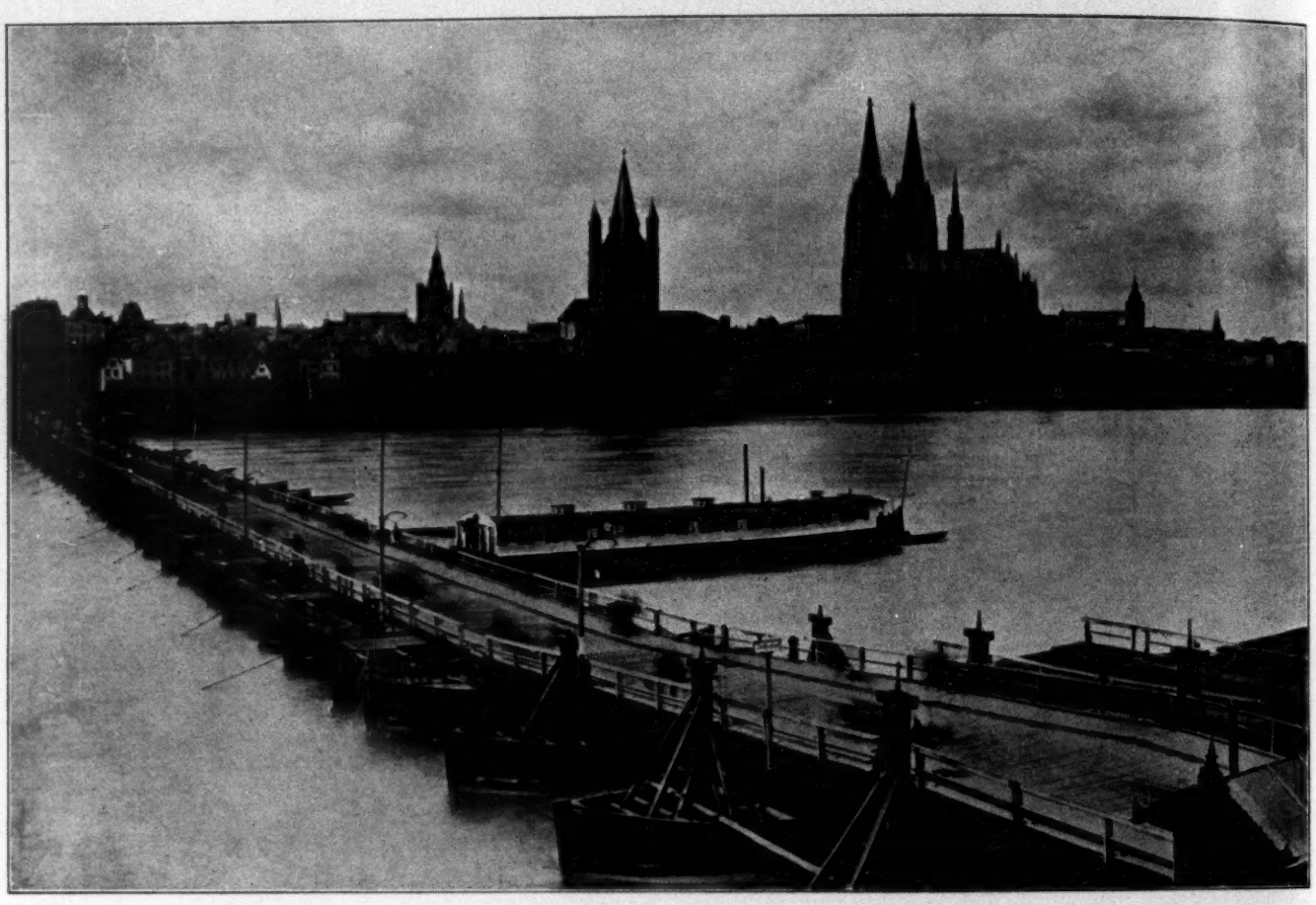

Photo by Frith.

BRIDGE OF BOATS AT COLOGNE.

Photo by Frith.

SION BRIDGE AND MOUNT ARDON.

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"THE STORY OF THE BRIDGE."—V.

GENERAL VIEW.

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PRINCIPAL ENTRANCE.

KING EDWARD MEMORIAL HOSPITAL, EALING.—Messrs. F. Hall-Jones & Erskine S. Cummings, A.R.I.B.A., Architects.

MONTHLY REVIEW · *of* · CONSTRUCTION.

SECOND REPORT OF THE JOINT COMMITTEE ON REINFORCED CONCRETE.

ONCE more the thanks of engineers, architects, and others making employment of reinforced concrete are due to the Joint Committee organised by the Royal Institute of British Architects.

Putting aside at an early date the prejudice which most engineers then cherished against reinforced concrete as a structural material, the Institute were the first scientific body in this country to recognise officially the obvious claims of that material. Although their first Report, issued in 1907, was not free from defects and omissions, it nevertheless possessed the great merit of presenting in simple and intelligible form a series of data and rules for the computation of beams and columns which have been of much practical value not only to architects, but also to public authorities throughout the United Kingdom, and to many of the firms who have taken up reinforced concrete work within the last four or five years.

The second Report* is virtually a revised edition of the first document, the chief alterations and additions being in the data given under the head of "Materials," in the "Methods of Calculation" (for beams), and in the section on "Pillars and Pieces under Direct Thrust." A noteworthy section has also been added on "Shear Reinforcement" (for beams). We are glad to find that several of the modifications suggested at different times in our columns have been made in the text of the present issue.

As a matter of convenience to readers we deal below with the various modifications and new matter *seriatim*, giving page numbers and other references for aiding ready identification.

In the first place, it may be noted that the constitution of the Joint Committee has been slightly altered by the substitution of Capt. Gibson Fleming for Colonel Mayne and Major Paul, representing the War Office, and by the inclusion of Messrs. F. Capon and E. F. Etchells as representatives of the London County Council, and of Messrs. C. F. Marsh and W. G. Kirkaldy as representatives of the Concrete Institute, the former of these two having previously been an unofficial member of the Committee.

The "Prefatory Note" is virtually identical with the section entitled "Report of the Committee" in the first Report. Many of our readers will welcome the alteration of paragraph (*e*), p. 6, to read:—"In all ordinary cases a cover of ½ in. on slabs and 1 in. on beams is sufficient. It is undesirable to make the covering thicker." The corresponding paragraph in the first Report demanded 1 in. on slabs and 1½ in. to 2 in. on beams, a quite unnecessary requirement which was not only bad from the practical standpoint, but also inconsistent with the permission, given later in the same document, for the placing of reinforcement not nearer "the surface of the concrete at any point than 1 in. in beams and ½ in. in floor slabs."

Under the head of "Materials" an important addition in the form of a footnote to Clause (6) is:—"Coke breeze, pan breeze, or boiler ashes ought not to be used for reinforced concrete. It is advisable not to use clinker or slag unless the material is selected with great care." These provisos come as a welcome recognition of the stand made in our columns against the persistent advocacy of the residual products mentioned by writers who relied upon fire-resistance and apparently were ignorant of the deleterious influence of coal residues on steel and of the instability of slag, to say nothing of the injurious elements usually contained in slags.

In Clause (7) occur the somewhat curious recommendations that "the proportions of the cement, sand, and aggregate should be separately specified in volumes" and that "the amount of cement added to the aggregate should be determined on the work by weight," cement being taken at 90 lb. per cubic foot. As weight is to be adopted finally, it would obviously be better to specify it in the first instance instead of asking the contractor to translate a percentage into weight by the aid of a coefficient, which is merely a rough approximation. The weight of Portland cement per cubic foot varies considerably with the specific gravity of the clinker and the fineness of grinding, and all architects and engineers who are wise will adopt the precaution of specifying the weight of cement that is to be added to stated volumes of sand and aggregate, for a given weight means a definite quantity of cement, and a given volume means cement and air in uncertain proportions.

Clause (8) paragraph (*b*) now states that the yield point of steel used as reinforcement should be "not less than 32,000 lb. per square inch," a provision more satisfactory and more exact than that in the former Report, where the elastic limit of from 50 to 60 per cent. of the ultimate stress was adopted as a criterion.

Paragraph (*b*) in the same clause is amended by omission of the unpractical and unnecessary "wash of thick Portland cement" previously recommended for the painting of steel bars before use.

Clause (9) now contains the timely advice that "No concrete which has begun to set should be used"—a point of vital importance, as known by all who have had any experience of reworked concrete.

The paragraph referring to hand-mixed concrete is the same as before. It would be improved by qualification to the effect that, as hand-mixing is less efficient than machine-mixing, the proportion of cement should be increased to make the concrete equal to that of material mixed by machine.

A footnote to Clause (10) emphasises the desirability of placing the full thickness of concrete in floor slabs in one operation.

In Clause (13) a very important and welcome alteration is to the effect that the strength of 1:2:4 concrete should not be less than 1,800 lb. per square inch at twenty-eight days, or 2,400 lb. per square inch at ninety days. The suggestion in the first Report that concrete of this relatively inferior composition should attain the compressive strength of 2,400 lb. in twenty-eight days has led to considerable misapprehension among architects and local authorities, which has tended in some measure to discourage the use of superior concrete.

Further attention to data connected with the strength of, and working stresses for, concrete materials are given in the succeeding section of the Report, entitled "Methods of Calculation," with which we will now deal.

In Clause (1) a footnote is added to the effect that the customary reduced estimate of floor loads should not be followed in the case of buildings containing heavy machinery, where the actual loads should be taken in full.

Clause (3), under the sub-heading "Beams," has been entirely rewritten, and is a great improvement on its predecessor. The clause now recommends that the bending moments for beams "must be calculated on ordinary statical principles, and the beams and slabs designed and reinforced to resist these moments." It also provides that where the maximum bending moments in beams or floor slabs continuous over three or more equal spans and under uniformly distributed loads are not determined by exact calculation, the bending moments should not be taken at less than $+ wl^2/12$ at the middle of the span, and $- wl^2/12$ at the intermediate supports.

This is a perfectly explicit statement in every way preferable to the former somewhat ambiguous wording, which was apt to be interpreted either as sanction for the moments $+ wl^2/24$ at the middle, and $- wl^2/12$ at the supports, or as sanction for taking $+ wl^2/12$ at the middle and $- wl^2/24$ at the supports.

It is now made clear that the value $wl^2/12$ is to apply throughout, but we should prefer the adoption of $wl^2/10$, in accordance with the practice of the best authorities and experts.

A new sentence in paragraph (*c*), p. 11, on stress distribution in reinforcing bars, points out that:—"In the case of steel of large section it may be necessary to consider the stress as varying across the section." While agreeing with this interpolation, we hope it may not often be needed, for the use of reinforcement in the form of large sections is quite contrary to the canons of reinforced concrete design.

Clause (5), entitled "Working Stresses," includes some welcome emendations. The first is that working stresses tabulated for concrete are on the basis of the crushing strength of 1,800 lb. per square inch at the age of twenty-eight days, instead of 2,400 lb. per square inch at the same age. The second is the abandonment of the unnecessary restriction of the limiting compressive stress in columns to 100 lb. less than that permitted in beams. No satisfactory reason has ever been assigned for the previous limitation, which seems to have been adopted at first by the Committee as a safeguard and in compliance with the recommendations of some American writers. The French Commission make no distinction of the kind. The third is that for steel in tension, with the tenacity of 60,000 lb. per square inch, the working stress is fixed at 16,000 lb. instead of 15,000 lb. to 17,000 lb. The new limit, being exactly half the stress at the yield point, is strictly logical. The fourth is that the compressive stress for steel is fixed at fifteen times the stress in the surrounding concrete, this numerical factor being governed by the value $E_s/E_c = 15$. The fifth is the specification of 12,000 lb. per square inch for the working stress of steel in shear. No recommendation was made in the first Report with regard to compressive and shearing stresses in steel. The sixth is an important improvement, for the working compressive stress in concrete mixed in proportions other than 1:2:4 may now be taken at one-third the crushing strength at the age of twenty-eight days, instead of one-fourth for beams and one-fifth for columns. In the case of steel the allowable tensile stress may be taken at one-half the stress at the yield point, but not exceeding 20,000 lb. per square inch.

The foregoing alterations will give considerably increased scope to designers of reinforced concrete structures, while guarding against the adoption of excessive compressive and shearing stresses in steel, as sometimes taken in the past. There is one point, however, which we are sorry to find has been left unaltered, namely, the limit of 60 lb. per square inch for concrete in shear in beams. Concrete in simple shear is quite capable of withstanding stress up to at least 50 per cent. of its compressive strength. The Joint Committee evidently have in mind, not shearing stress itself, but shearing stress as the measure of

* London: The Royal Institute of British Architects, 1911.

indeterminable tension on diagonal planes in the concrete of beams.

Considering this aspect of the case, we cannot afford to disregard the results of well-authenticated tests which show that for concrete mixed in the proportions of about 1 : 2 : 4, the shearing stress of 100 lb. per square inch, or a little more, should be taken as a limit not to be overstepped without the risk of failure by diagonal tension.

Consequently the working stress, regarded as the measure of tension on diagonal planes, should not be more than 25 lb. or 30 lb. per square inch. In Clause (4), paragraph (*b*), p. 11, the Committee say :—"The resistance of concrete to tension is neglected, and the steel reinforcement is assumed to carry all the tension." Therefore, as the stress now in question is really tension and not shear at all, the resistance of the concrete ought logically to be neglected and steel applied to carry the stress. This is the practice of expert designers, and we should like to see it officially adopted, concurrently with a wider limit for simple shear considered on its own merits.

Turning now to beam equations, we regret to notice that, despite the statement of permissible stress for steel in compression, no formulæ are included for the guidance of persons wishing to design beams with reinforcement in compression as well as in tension. Such formulæ are clearly demanded for the three classes of beams covered by the series of equations relating to tension reinforcement only. Their omission in the second, as in the first, Report is distinctly unfortunate.

The equations now given in remodelled form on pp. 12 to 14 provide completely for the calculation of T-beams, where the neutral axis falls outside, T-beams where the neutral axis falls within the slab, and rectangular beams, a very convenient feature being the adoption of the standard notation proposed by the Concrete Institute. Another noteworthy improvement is the adoption of a more simple sectional area in the first class of T-beams as the basis for computing the proportionate area of tension reinforcement.

As before, the equations are based on the straight-line theory, and so involve nothing fresh from the theoretical standpoint. The only objection to them is the unnecessarily complicated aspect they present to the eye, and the labour their employment will involve in practical work.

It would be perfectly easy to express the same meaning in much more simple terms. As an example we take the equation, on p. 13, for the tensile resistance moment of a T-beam, where the neutral axis falls outside the slab. As written in the Report the equation is :—

$$R_t = tbd^2 \frac{(s_1^2 + 4\,mrs_1^2 - 12\,mrs_1 + 12\,mr)}{6\,m\,(2 - s_1)}$$

Now this can be put more conveniently in the same notation as follows :—

$$R_t = bd^2\left[tr\left(1 - \frac{3\,n_1 s_1 - 2\,s_1^2}{6\,n_1 - 3\,s_1}\right)\right]$$

In the simplified form numerous repetitions of m, r, and s_1 are avoided, the result calculated for the term within square brackets is applicable to beams of any dimensions, and for approximate computations the value of the term within the small brackets, representing the proportionate length of the arm of leverage of internal forces, can be assumed at, say, 0·9, which is a fair average for ordinary beams. Moreover, the simplified equation lends itself conveniently to the preparation of tables and diagrams containing values from which the exact resistance moment for beams of any dimensions can readily be obtained by multiplication into the quantity bd^2.

No doubt those who are quite at home in mathematical exercises can perform the work of simplification for themselves, while there are many others who would be grateful to the Joint Committee for a simplified series of working rules.

The new section, entitled "Shear Reinforcement" (p. 14), deals with the important question of web reinforcement for beams. Subject to the reservation that 60 lb. per square inch as the working stress for concrete in shear does not provide an adequate factor of safety in respect of diagonal tension in beams, the procedure recommended is quite satisfactory, and the inclusion of rules for web reinforcement fills up a gap that was left open in the preceding Report.

We are glad to observe also that the section on "Pillars and Pieces under Direct Thrust" (p. 15) has been amplified by equations and data taking into account the valuable aid rendered by lateral reinforcement, which, properly disposed, raises the ultimate strength and increases the security against sudden failure by reducing (not *preventing*, as inadvertently stated in the Report) the lateral expansion of the concrete. The stipulation that an ample proportion of longitudinal reinforcement shall also be applied is wise, for, however great may be the value of lateral binding as auxiliary reinforcement, the longitudinal bars are always of primary importance both theoretically and practically.

The table of factors on p. 17 for different forms of lateral reinforcement will be found useful as a guide, but it is not improbable that the values there given may require modification when further experiments have settled more definitely the relative efficacy of helical, circular, and rectilinear binding for the core of reinforced concrete columns and struts.

The new subsection on "Working Stresses" (p. 18) contains features that should be widely appreciated. The recommendation of the safety factor of 4 at ninety days for all pillars is a further example of the recognition accorded elsewhere in the Report of the fact that concrete cannot be fairly judged by its strength at the tender age of twenty-eight days, and the table of working stresses makes quite plain the intention of the Committee that higher stresses are permissible for qualities of concrete superior to 1 : 2 : 4 mixtures. The specification of cement by weight in the same table is another commendable feature, as also is a footnote conveying the much-belated explanation in respect of 1 : 2 : 4 concrete at the age of twenty-eight days that "the limit of 2,400 lb. per square inch given in the previous Report of the Committee was adopted on the assumption that the cubes would be rammed with iron rammers under laboratory conditions."

The absence of this explanation has caused not a little inconvenience to reinforced concrete specialist firms during the past three or four years, especially when dealing with architects and engineers, who, with the object of being perfectly safe, have adopted the practice of interpreting literally the wording of the first Report.

The present Report concludes with a series of appendices, discussing various theoretical points raised in the text, and at the end is a tabular statement of the equations for singly reinforced beams. At the beginning of the pamphlet the notation adopted throughout is printed on a folding-plate which can be opened for reference while formulæ are being studied.

Taken as a whole, this second Report marks a great advance, making clear several points previously capable of varying interpretation, and setting a more liberal standard for the employment of reinforced concrete, while providing reasonable safeguards for the protection of architects and their clients. It is to be hoped that when the Committee of the Institution of Civil Engineers have advanced to the stage of being ready to formulate recommendations, the Institution will be prepared also to co-operate with the Joint Committee in the establishment of regulations, and so obviate the inconvenience, at present threatened, of two independent and possibly conflicting codes dealing with reinforced concrete work.

SOME CONTINENTAL IDEAS OF SLATING.

By H. Y. Margary.

On the Continent of Europe in general, and in France, Belgium, and parts of Germany in particular, there is, and has been from early times, a great love for elaborate roofs. This elaboration applies not only to the way in which roof surfaces are broken up by means of gables, dormers, turrets, chimneys, etc., but also extends to the texture of the roof surfaces themselves. In these countries some charming effects are produced by means of slates laid in a manner resembling the scales of a fish. There is a great variety of ways in which this effect can be produced. Three of these are shown in Fig. 1, that at A being perhaps the best known in this country; but the fact that each slate is fixed by one nail only renders a roof slated by this method somewhat noisy in a high wind, while it is essential that the slates hang vertically upon the roof. This arrangement does not seem to please the continental architect, who prefers the general lines of his slating to run obliquely in gentle curves across his roof surfaces, as suggested in Fig. 2. For this reason he more often uses slating of the types shown at B and C, Fig. 1. A doubling course at the eaves is required when slating as shown at A is used, but this is unnecessary with the other two types.

Interest is added to a roof by laying one or two lower courses with the edges of the slates running in a different direction to the remainder of the slating. The simplest way to do this is to commence by laying a slate at a right-hand verge with the tail overhanging the tilting fillet, as shown at *a*. Fig. 1, B, a piece of slate *b* being fixed beneath it where the roof boarding would be otherwise exposed. The remaining slates of the course are laid with the edges lapping about 3 in. beyond the nail holes of the slate previously laid, the upper corners of the slates being arranged to form a curve, as mentioned above.

Fig. 1, C, shows the slating commenced at a valley board, the right-hand slate of the first course being cut so that it tilts up upon the valley board as hereafter explained.

The second course is then laid so as to give a lap that is nowhere less than 3 in.

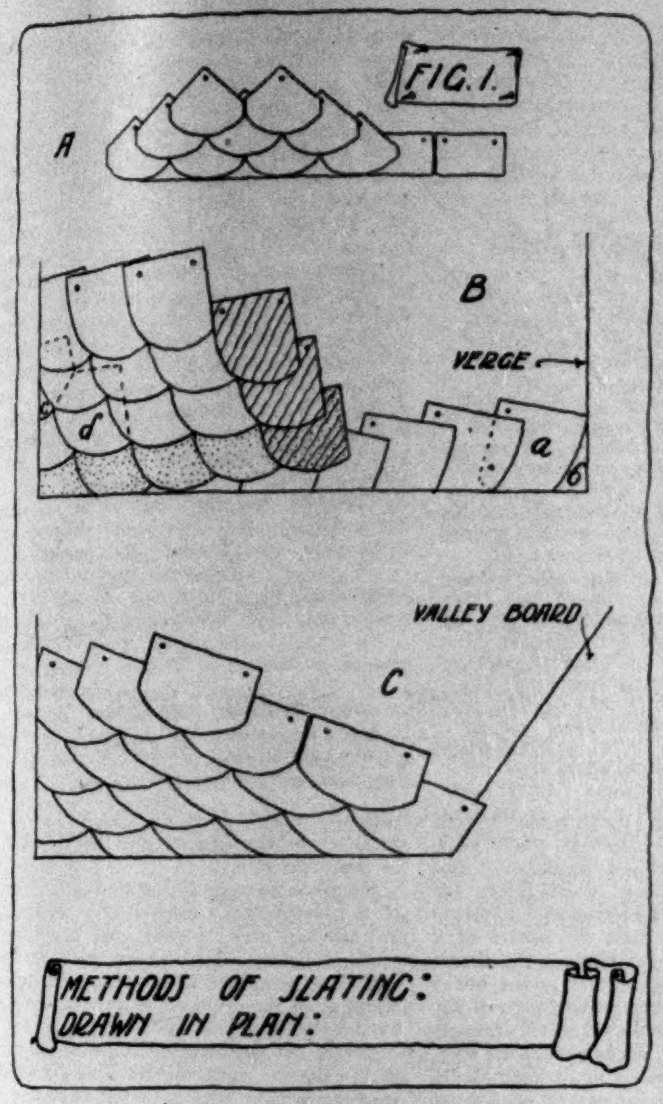
Where the slates come against the eaves or verges they are cut off as shown.

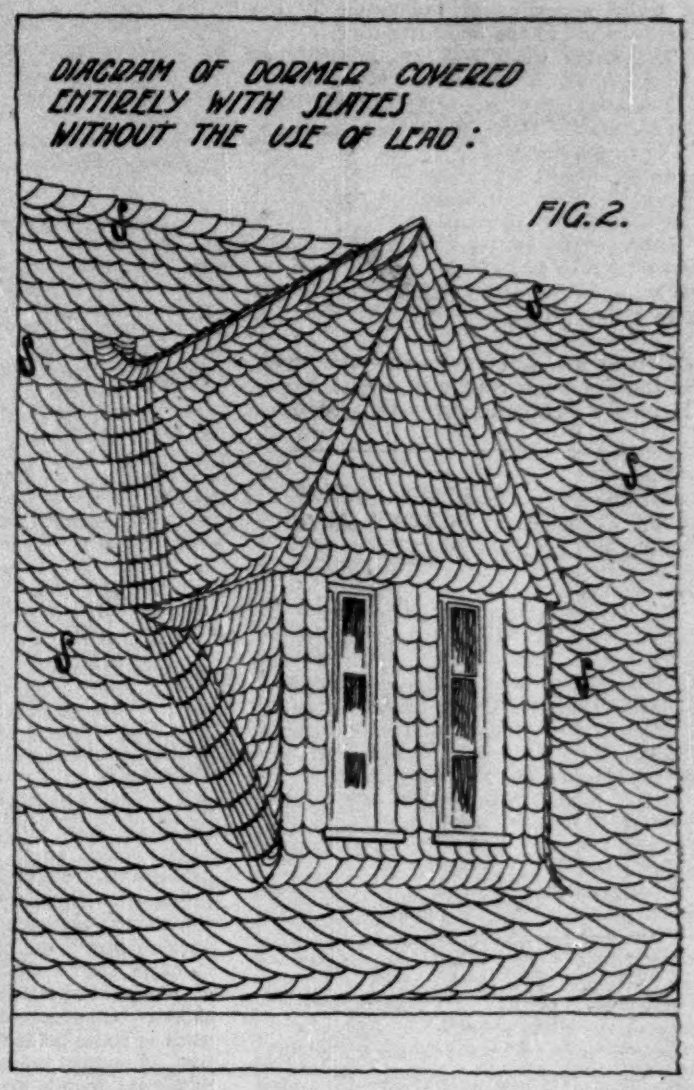
Inconveniently small pieces will be obtained at the verges by cutting the end slates only, but these may be avoided by cutting the end slate, as shown at *c*, Fig. 1, B, to the shape of the dotted outline, and by cutting a corresponding portion off the adjoining slate *d*.

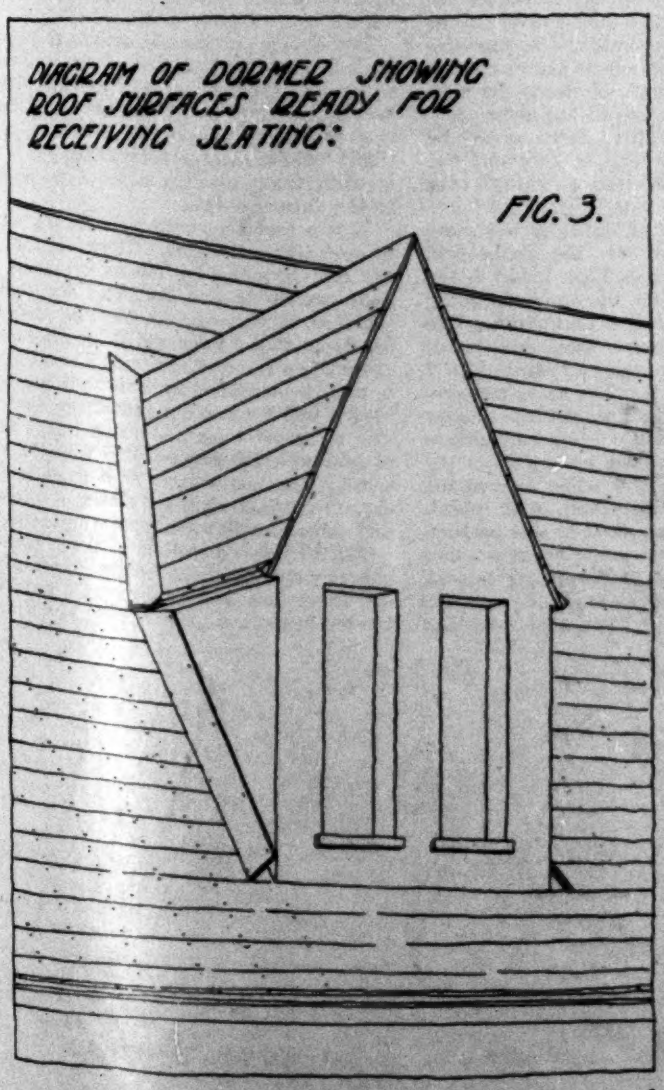
It should be noticed that the slates may be laid in courses either across or up the roof, as indicated by the dotted and hatched shading respectively at Fig. 1, B.

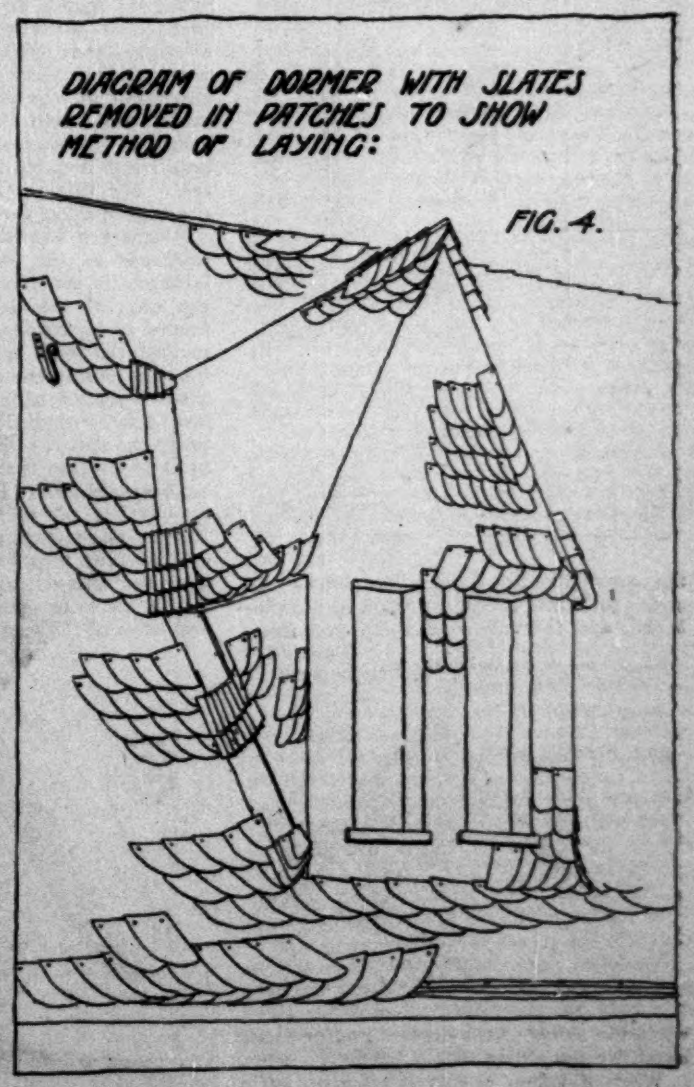
It is usually most convenient to lay the courses across the roof except near the verges, where, by laying the slates up the roof, any cutting and adjusting such as that shown at *c* and *d* is more easily performed.

Some charming effects are produced by forming all intersections of roof surfaces entirely in slate, *i.e.*, without the use of lead, zinc, or other similar material. Fig. 2 shows a dormer treated entirely in slate. Fig. 3 shows the same dormer boarded ready to receive the slating. The dormer gable and cheeks may be of brick, boarded studding, or any other suitable material; it makes no difference to the method of hanging the slates, save that battens or fixing slips are necessary when the dormer is formed of any material that will not take the slating nails. It will be seen that boards are nailed across the valley at an angle of 45 deg., those between the main roof and dormer cheeks being cut to fit under the dormer eaves, and those between the main and dormer roofs having their upper ends mitred. These valley boards are from 6 in. upwards





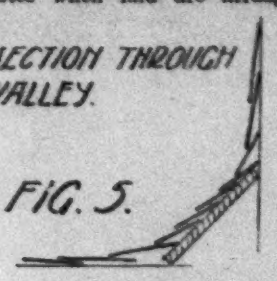




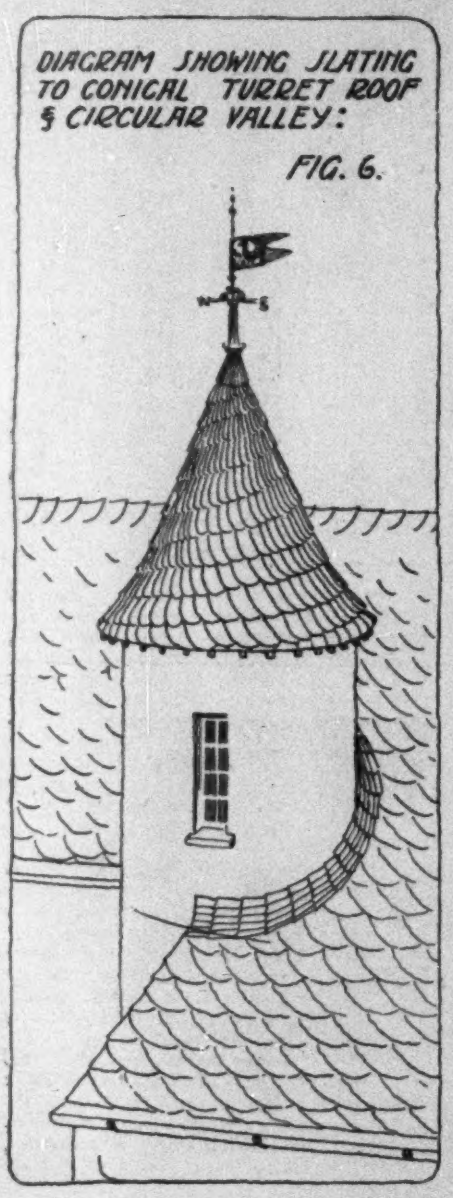
Some Continental Ideas of Slating.

in width according to the nature of the curve desired in the finished slating.

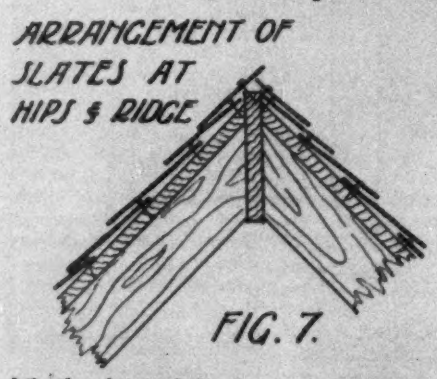
The slates when laid are arranged as



shown in Fig. 4, narrow strips being used, as these conform readily to a quick curve. Fig. 5 is a section through a valley, showing



the arrangement of slates. The slates of the main roof are tilted up upon the valley board, and the valley slates lap over them,



while the slates of the dormer roof or cheek overhang the valley slates.

When a valley is curved on plan, as in

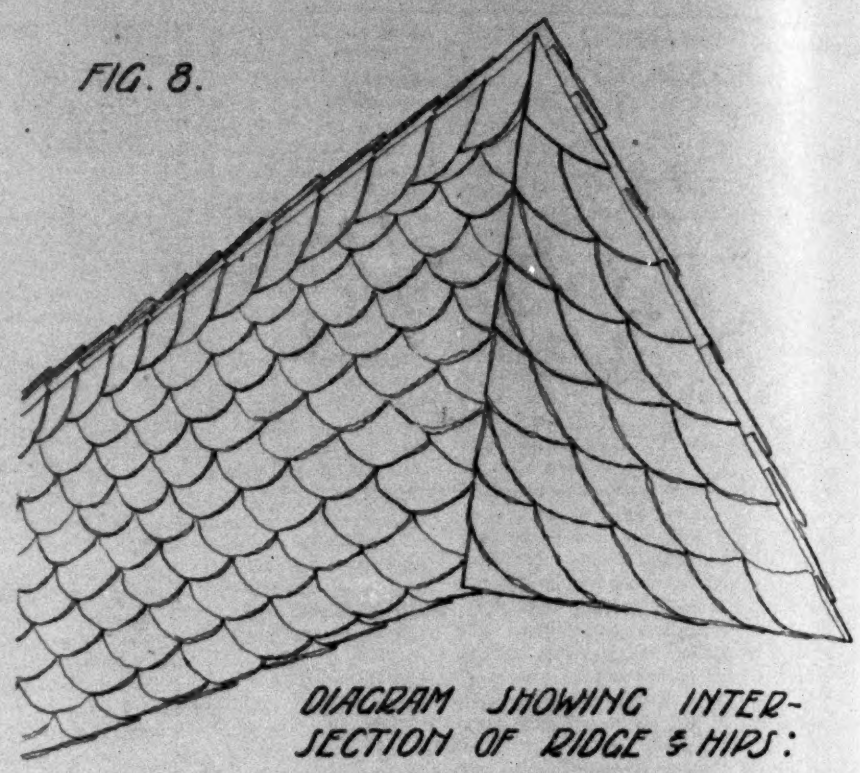


Fig. 6, it is still carried up in a curve from the main roof surface, but in place of a valley board, which would be difficult and wasteful to cut and fit, short fillets are employed. These are nailed at 45 deg. across the valley, radiating from the centre of a circular turret, or, if the plan of the turret be other than a circle, normal to the curve on plan, the spacing being the gauge of the slating. On a turret roof the general arrangement of slates is the same as on a plane roof, but, of course, the slates must decrease in width and length, and the curved edge must be flattened towards the top so as to ensure a proper lap at every point, and so that the slates conform more closely to the increasing sharpness of curvature. If the slates were carried right to the top of the cone they would be so narrow that there would be insufficient horizontal laps to keep out the rain. For this reason lead is bossed over the upper part of the roof.

Ridges are formed of slates of the same thickness as the rest of the slates laid horizontally, as shown in Figs. 2 and 4, the top edge of the slates on one side being carried up higher than that on the other side so that the joint between them is covered, thus preventing the passage of rain. Fig. 7 shows a section of this. The same arrangement may be applied to hips, but it is simpler to cut the slates at the hips on one roof surface so as to overlap the slates on the adjoining surface, as shown in Fig. 8. Fig. 2 shows the intersection of a ridge and roof plane. Narrow ridge slates are used in this position so that they may be worked up in a curve over the mitred ends of the valley boards. As the curve ascends the angle between the two sides of the roof is flattened out so that the uppermost slates lie flat on the main roof, where they are covered by the slating of the main roof.

For slate hanging the general arrangement of the slates is the same as for roof slating, but the lap may be diminished if required.

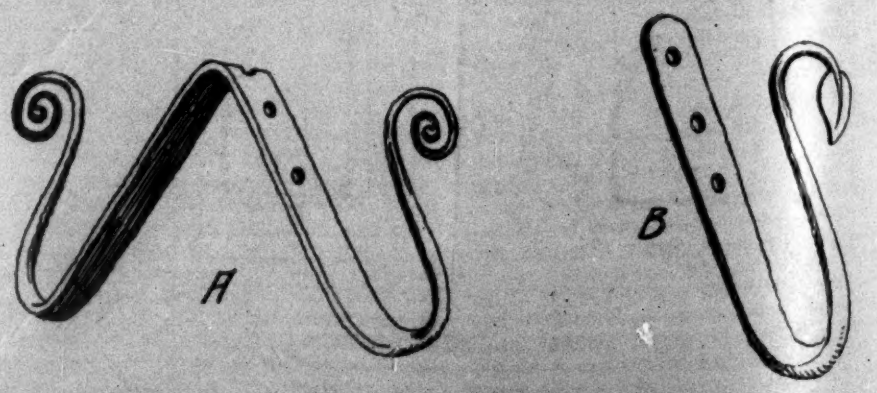
Each course of slates on each mullion, Fig. 2, is composed of two slates, one rather wider than the other, so as to bring the joint to the centre of the mullion.

A straight course is shown below the verge of the dormer gable, but, of course, the gable may terminate with a moulded cornice or with a barge board, as desired.

The slating on the dormer cheeks projects an inch or so beyond that of the gable wall, so as to form a weather-resisting joint. Where the gable wall intersects the main roof the lower edge of the slate hanging is tilted forward, and is cut at each end to fit beneath the projecting edge of the slating to the dormer cheeks.

It is a prevalent custom to fix iron hooks in rows along the roof. These are fixed to the roof boarding by means of screws or nails preferably over rafters. Fig. 9 gives sketches of these hooks, A being designed for fixing at the ridge and B for fixing lower down upon the roof surface. The beauty of a roof is considerably enhanced by these hooks, which are often beautifully wrought. The commonest form is made from a strip of iron with the exposed end worked into a scroll. The hooks serve as a fixing for the slater's scaffold when the slating is first laid and subsequently when repairs are necessary.

Fig. 10 shows a method of slating round a chimney-stack without the use of lead. Here the front face and flanks of the stack are treated in the same way as a dormer, but the



arrangement of valley boards and slating at the back of the chimney calls for some explanation. The upper ends of the valley boards *a a* are cut so that when fixed they are at an angle of 45 deg. to the horizontal. Two fillets such as *b* are spiked to the back of the chimney at an angle of 45 deg. to the horizontal, the upper edge of the lower end being kept below the upper edge of the board *a* by a distance equal to the thickness of the roofing boarding so that when the surface *d* is formed its lower edge will be flush with either upper edge of *a*. Next two fillets are nailed to the roof at an angle of at least 30 deg. to the horizontal, and the surface *d* is formed by nailing narrow boards between the fillets *b* and *c*. The angle between *d* and the main roof surface is eased off by means of a tapered valley board *e*. An arrangement of surfaces is thus obtained, which tilts away from the back of the chimney-stack, and is so gently eased that the slates may be easily laid upon them so as to throw off the water.

It is best to form a gable at the back of very wide chimney-stacks with the valleys formed as already explained.

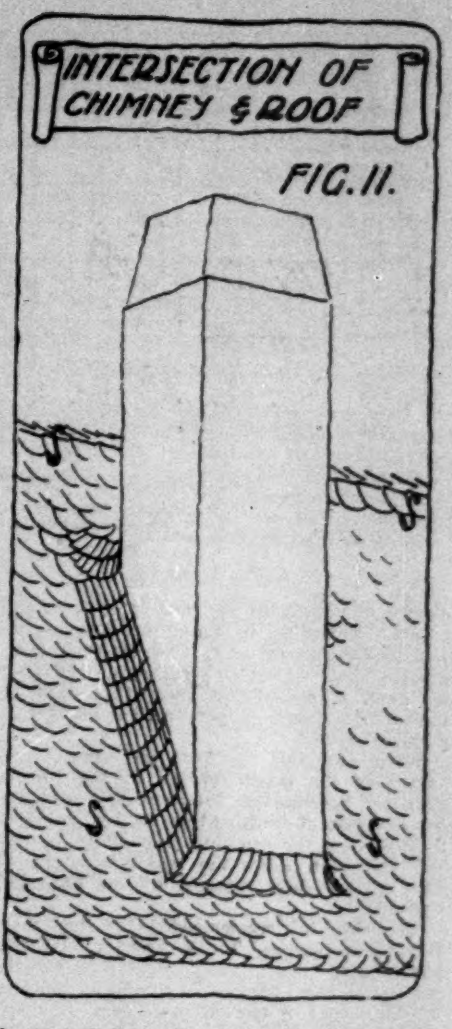
The ridge in Fig. 10 is formed as already explained.

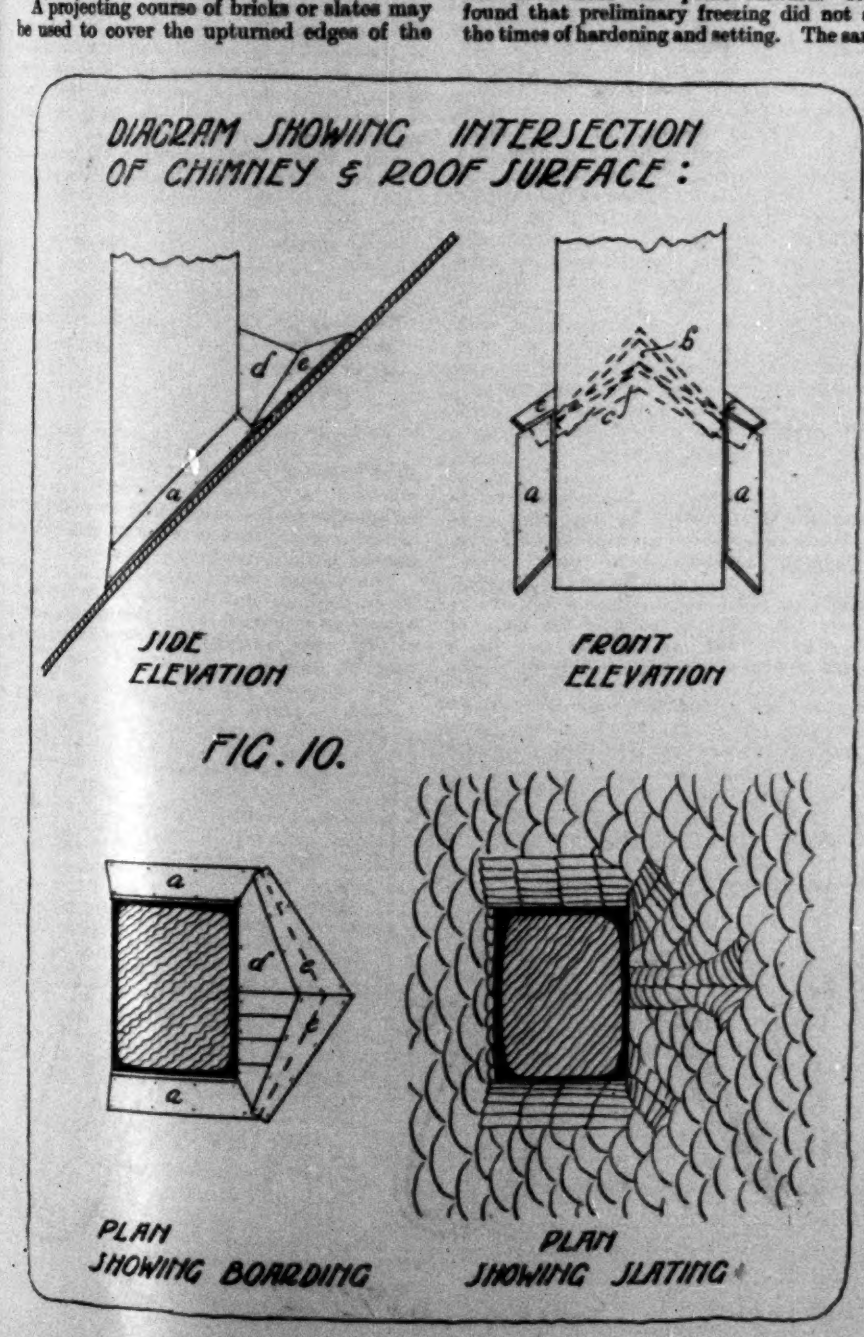
The first two or three courses of slates at the back of the stack are usually formed of narrow slates, but the remainder may usually be of the same kind as used for the main roof, with rather a larger lap.

Fig. 11 gives a general idea of the appearance of a stack with the surrounding slating finished off.

A projecting course of bricks or slates may be used to cover the upturned edges of the slating round a stack, but when the stack is rough-cast the upturned edges of slate are covered with this material.

The explanation of these slating details is somewhat lengthy, but once the slater has seen work carried out as described above he will find no difficulty in actually performing the work himself.





CONSTRUCTION NOTES.

Frozen and Rethawed Mortar and Concrete.

Mr. H. Burchartz has made experiments to determine the effect of frost, if any, on the subsequent hardening properties of cement, mortar, and concrete, these having been previously mixed ready for use:—

Cement.—Tests were made on two samples of cement, which had been prepared in the dry and wet ways respectively. The cements were mixed with water to a stiff paste, and the time taken for hardening to begin and for complete setting under the conditions stated below:—

(1) The cements were allowed to set under normal conditions.

(2) The cements were kept as nearly as possible at a temperature of 0° C. = 32° F.

(3) The cements were subjected to a temperature of — 10° C. for three hours.

(4) The cements were subjected to a temperature of — 10° C. for twenty-four hours.

(5) The cements were subjected to a temperature of — 10° C. for seventy-two hours.

These frozen samples, viz., (3), (4), and (5), were, at the expiration of the hours stated, broken up with a hammer, and, after being allowed to thaw, were stirred for three minutes. The times for hardening and setting were measured from this point forward. It was found that preliminary freezing did not affect the times of hardening and setting. The samples kept at 0° C., however, were about four times as long as the others in reaching each stage. During the tests the temperature and humidity of the air were carefully noted. The same cements were used to make mortar and concrete.

Mortar and Concrete.—The mortar consisted of 1 part by *weight* of cement to 3 parts by weight of standard sand. The concrete was made up of 1 part of cement to 5 parts of gravel. Two classes of each were prepared, sufficient water being added to make the mixture in the one class (1) "earth damp," and in the other (2) "wet."

Test pieces were made (1) immediately after mixing, and (2) after subjecting to a temperature of about — 14° C. (equal to 6·8° F.) for (a) three hours, (b) twenty-four hours, (c) seventy-two hours, and subsequently thawing. The test pieces were allowed to set under damp sand, some for seven days, and the remainder for twenty-eight days, and then tensile and compression tests were made.

The results showed that cooling for a few hours only had a negligible effect on the hardening of mortar and concrete, but that the rate of hardening was much lower after a prolonged freezing, this being strikingly accentuated for the "earth damp" over that for the "wet" mixings.

Testing Concrete and Materials for Reinforced Concrete.

An interim report presented by the Tests Standing Committee of the Concrete Institute deals with the testing of materials used for concrete, plain and reinforced, and of specimen blocks of concrete. The testing of reinforced concrete is under consideration and will form the subject of a later report.

Although the classified list of aggregates includes crushed slag, clinker, and coke breeze, we are glad to see a note to the effect that these are not recommended for reinforced concrete. The point is one which we have emphasised on several occasions during the past four or five years.

The accompanying diagram gives the result of a series of tests denoting the percentage of voids in various kinds of aggregates and sand. This diagram is interesting, but cannot be accepted as a guide in practical work where fragments and particles exhibit wide variations from time to time.

The deleterious effect of dust in sand is

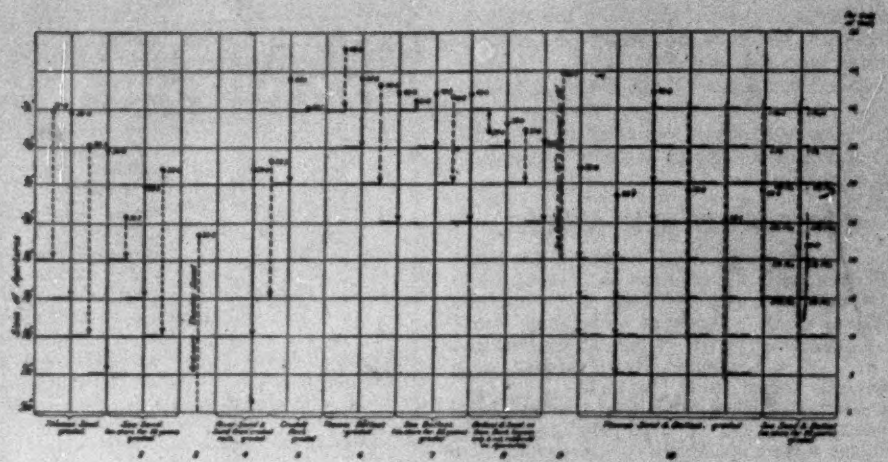


DIAGRAM SHOWING PERCENTAGES OF VOIDS IN VARIOUS BALLASTS AND SANDS.

clearly demonstrated by tests quoted in the report. According to these the compressive and tensile strength of 1 : 3 mortar made with granite and whinstone crushings, including all dust, is remarkably lower than that of mortar in the same proportions, but made with standard sand.

While accepting the tests for cement contained in the latest revision of the British Standard Specification, the committee advocate the adoption of crushing tests on 3-in. cubes of 1 : 3 mortar, the crushing strength to be not less than ten times the tensile strength at twenty-eight days required by the Standard Specification.

The standard recommended for steel may be thus summarised: Tensile strength, 60,000 lb. per square inch; yield point, 34,000 lb. per square inch; contraction of area at fracture, 45 per cent.; or elongation of bars not more than 1 in. diameter 25 per cent., on a length of eight diameters, the elongation for larger bars being fixed at 30 per cent. on a length of four diameters. The usual cold bending test is also included.

For determining the crushing strength of concrete the Committee recommend that tests shall be made on six 4-in. or 6-in. cubes in every case, three cubes being moulded in the laboratory and three on the works under construction, the concrete to be taken from the actual mixing plant.

It should be noted that the cubes can be made in metal moulds and the concrete worked in by punning and tamping and afterwards gently rammed. Differences of manipulation will certainly be followed by variable results, and unless some standard mechanical contrivance can be adopted for filling the moulds we fear that misleading results will be unavoidable.

One very commendable suggestion is that specifications should provide for a provisional sum to be expended in the various tests required.

Rendering Linoleum Fireproof.

MR. F. FRITZ, investigating the properties of linoleum, has found that certain attempts to render linoleum fireproof by substituting asbestos, kieselguhr (sometimes spoken of as "fossil meal"), etc., for the cork-powder have not met with any appreciable success. On the other hand, good results have been attained by adding to the ingredients of the linoleum substances which when heated emit gases that would extinguish a flame. Suitable proportions he finds are:—Twenty parts by weight of cork-powder, 17 of linoleum cement, 8 of sodium bicarbonate, and 4 of ochre. The addition of the sodium bicarbonate does not have any apparent injurious effect upon the finished linoleum, and the temperature at which it decomposes is far above that of the kneading process. It is unnecessary to impregnate the jute basis with the salt, though in certain cases the fabric may with advantage be soaked in a weak solution thereof, and then dried. To find out how much "linoleum cement" is contained in a sample Mr. Fritz recommends a modification of the method suggested by Messrs. Ulzer and Baderle.

The last named technicians estimate by heating the finely-powdered material with benzene in a sealed tube at 150° C.; but Mr. Fritz finds that the "cement" is not completely dissolved by this treatment, and that better results are obtained if, after heating, the residue is extracted with a mixture of benzene and chloroform.

The nature of the residue may be qualitatively, and in some measure quantitatively, determined by a subsequent microscopical examination.

Testing Materials of Construction.

WITH a few notable exceptions, the testing of structural materials has not been undertaken systematically in this country, either by Government or by scientific societies. There was once, and perhaps may still be, a comatose British section of the International Association for Testing Materials, but for some reason this organisation never seemed to flourish. In the United States a similar branch has blossomed out into an independent society of continued vitality and activity. This is shown by the annual meeting held under the presidency of Dr. H. M. Howe at Atlantic City in July last, when 450 members and visitors were present, the total membership of the Society being 1,400 at present. A new stage of development is indicated by the evidences of systematic work conducted by numerous committees and sub-committees by whom various classes of material have been under consideration during the past year. Many important progress reports, completed specifications, and papers were submitted at the annual meeting.

Sound-Resisting Walls and Ceilings.

A METHOD recently devised in Germany for rendering walls and ceilings capable of effective resistance to sound transmission is illustrated diagrammatically in the accompanying sketch.

Under the ceiling or soffit of the floor, or parallel to the wall, as the case may be, a network of wire is stretched tightly by means of pulleys, secured as at *a* into the adjacent walls, and not touching at any point the surface to be protected against sound. Then upon the wirework is plastered a composition formed of strong glue, plaster of Paris, and granulated cork, so as to make a flat slab between which and the wall or ceiling is a cushion of confined air.

The inventor points out that the arrangement is advantageous in the case of certain types of fire-resisting floors which, although otherwise excellent, are characterised by excessive sonority. He also draws attention to the fact that sounds are often transmitted from one part of a building to another, and from adjoining buildings through contiguous walls. This contention is undoubtedly correct, and those who undertake to provide against the conduction of sound will do well not to limit their efforts to the treatment of floors.

The method described is good in two respects:—(1) The absence of contact between the protective and protected surfaces; and (2) the colloid nature of the composition recommended for plastering.

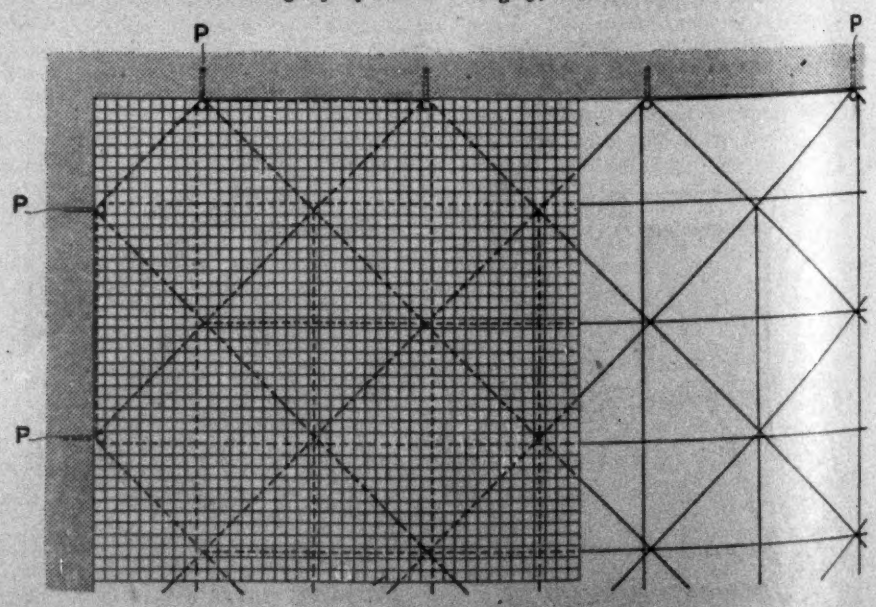
Reinforced Concrete Notes.

THE use of reinforced concrete is rapidly extending, encroaching on the province of other materials. Several years ago reinforced concrete was tried in the form of sleepers by an English railway company, and the result was satisfactory. Now three companies—the London and North-Western, the Great Northern, and the Great Eastern—have utilised reinforced concrete for fence posts. As is well known, creosoted wooden posts require renewing, their life not being more than some twenty years. On the other hand, reinforced concrete has a much longer life, being in fact practically imperishable, so that, even if its first cost is greater, its advantages counterbalance first economy. The cost of such posts runs out at about 6½d. a foot lineal, and in cases where cement, iron, and sand are cheap locally the cost of reinforced concrete posts is less than that of creosoted wooden ones. Similarly for farm use reinforced concrete is a boon to the small farmer. Posts, drinking-troughs, channels, and a variety of other parts about the farm can be easily made by the farmer himself in his spare time, and especially in the case of cattle drinking-troughs greater cleanliness is obtained.

Economy in Building by Use of Terra-Cotta.

THE use of terra-cotta in the State Educational building at Albany, N.Y., in place of marble in the decorative features, it is claimed has enabled a saving of 100,000*l.* to be made in this building. The plain parts of the building and the shafts of the twenty-eight columns which are employed have been executed in marble, the decorative portion, including large Corinthian caps, have been made of terra-cotta glazed to a colour to match the marble work.

The cost of these capitals, which are some 10 ft. high, is said to have been 89*l.* each, against an estimated cost of the same in marble of 480*l.* each, a saving on the capitals alone of, roughly, 11,000*l.*



Sound-Resisting Walls and Ceilings.

THE BUILDING TRADE.

RECENT WORKMEN'S COMPENSATION CASES.—I.

Arriving At and Leaving Work.

WE have from time to time suggested certain principles which would assist in enabling employers and workmen to determine when the employment commences and ceases, and, consequently, when they are within the Workmen's Compensation Act. We may refer in particular to the articles in the *Builder*, November 2, 1907, and August 27, 1910. Some recent cases serve further to illustrate and support the principles enunciated in the article November 2, 1907. We then laid it down that, "although not absolutely at the actual place where his work has to be performed, a workman arriving at or leaving premises which are under the control of the employer for the purposes of getting to or from his work will be deemed still to be in the course of his employment if he is furthering his employer's interests," and in that article and the article of August 27, 1910, we illustrated that proposition by reference to decided cases.

One or two recent cases make the matter even clearer. In Gilmour *v.* Dorman, Long, & Co., Ltd., a workman employed at steel works elected to go to his work across a footpath which traversed some land of his employers, but which necessitated his walking at some part of his journey to the works along a railway line. He slipped and was injured whilst on the land belonging to his employers, but the Court of Appeal held that he was not injured "in the course of his employment," as his employers could not authorise him to approach by a route which necessitated trespass on the railway line and there was an alternative way he could have selected. The Court of Session have come to a similar conclusion in the case of McLaren *v.* Caledonian Railway, where a man in the employ of the railway company started to traverse the railway line instead of walking down a road which connected two places at which he was employed. These cases well illustrate the concluding words of our article August 27, 1910, that a man, if he approaches or leaves work by a route within the contemplation of the parties will be within the contract of employment, but not so if, for his own convenience, he is taking an unauthorised route even over his employer's premises.

Continuous Employment, or Employment Implying Residence on Premises.

When the employ is continuous, or involves residence on the employer's premises, the same principles apply. We treated on this aspect of the law in articles January 9, 1909, August 13, 1910, but one or two recent decisions further illustrate the problem. If an employee has to return to the premises, and is doing so by the recognised means of access and is injured, he will have met with the accident "in the course of his employment" (see Moore *v.* Manchester Liners, the *Builder*, August 13, 1910), provided, of course, that he had no committed a breach of contract by being absent at a wrong time or without leave. If he is away with leave, but on his own business, it is essential to prove that, at the time the accident occurred, he had reached his employer's premises or some means of access to the same under their control, or the accident will not arise out of his employment (see the decision of the House of Lords in Kitchenham *v.* Owners of s.s. *Johannesburg*. If he is on his employer's business he is continuously under the Act, provided, of course, that he runs no unnecessary risk outside the scope of employment.

INCREMENT VALUE.

In some recent correspondence in the *Times* on the "Administration of the Finance Act" the very uncertain nature of increment value has been exemplified by the divergent views expressed. One correspondent, writing from the House of Commons, has even gone so far as to declare that house property, apart from the land upon which it is built, can never increase in value, and that as long as the cost of labour and materials remain the same, the supply being unlimited, demand can have no effect on its value. He argues from this that land is the only factor that can appreciate, and the value of the perishable article, the house, having been found, the value of the land can easily be determined.

There is unfortunately too much ground for thinking that the valuation officers proceed on some such view as this in making their valuations. They consider the bricks and mortar to be perishable, and when an occasion arises treat any difference shown between the original valuation and the valuation on the occasion as attributable to a rise in the value of the land. This may be very well on paper, but how does it strike the ordinary builder? Lord Sheffield has pointed out that fashion may affect the value of house property quite apart from any fluctuation in the value of the land, and we think all builders will endorse his view. Under the Finance Act fashion or demand is attributed entirely to site value, but we think the fallacy of any such contention may be exposed by considering the case of houses of a particular character. Of late years there has been a demand for houses of any definite period, such as Elizabethan houses, Georgian houses, etc. Houses in the neighbourhood of such a house of character may have depreciated, but a fancy price will be given for a house of genuine antiquity. What has the value of the land to do with this? The land, owing to encroachment of buildings of an undesirable character, may have depreciated, but the demand is for the house itself. Yet if the principles above enunciated be applied to such a property a sum for depreciation must be written off, which would leave hardly any value at all, and the high price obtained for something in the nature of a curio would be attributed entirely to the land. Such a case shows the injustice of this principle of taxation, and it is highly erroneous to exclude the question of demand. A house may be suitable for some particular purpose, and its adaptability to this purpose forms part of its value entirely independent of the value of the site. There appears considerable risk that the depreciation written off buildings will in every case be added to the site value, in which case owners of a wasting property will be taxed not on increment, but on depreciation. The whole subject certainly calls for a strict and impartial inquiry at the hands of competent persons.

CONCRETE PLANT FOR COLD WEATHER.

ALTHOUGH severe frost rarely prevails in Great Britain for long periods, the plant and arrangements described below will probably furnish some useful hints to contractors engaged in concrete work both in winter and in summer.

The methods in question were adopted by the Newton Engineering Company of Milwaukee for building a three-story warehouse, 64 ft. by 112 ft. in plan, having a reinforced concrete skeleton with brick curtain walls.

We give a sketch plan showing the arrangement of the plant, which comprised an electrically-operated concrete-mixer discharging directly into the bucket of an electric hoist consisting of a sectional steel tower with guides and head-frame for operation of the bucket-shaped cage. A special feature of the hoist was the manner in which the lower part was carried horizontally so as to cause the cage to pass under the outlet of the mixer so as to receive the concrete without involving the use of intermediary appliances. In addition to saving the cost of unnecessary handling this method possesses the recommendation of reducing to a minimum the period elapsing between the mixing and deposition of the material.

The electrically-driven gear for operating the concrete hoist was provided with an extra winding drum for transporting trucks of material running on the 24-in. gauge track shown in the plan, and for rendering other aid.

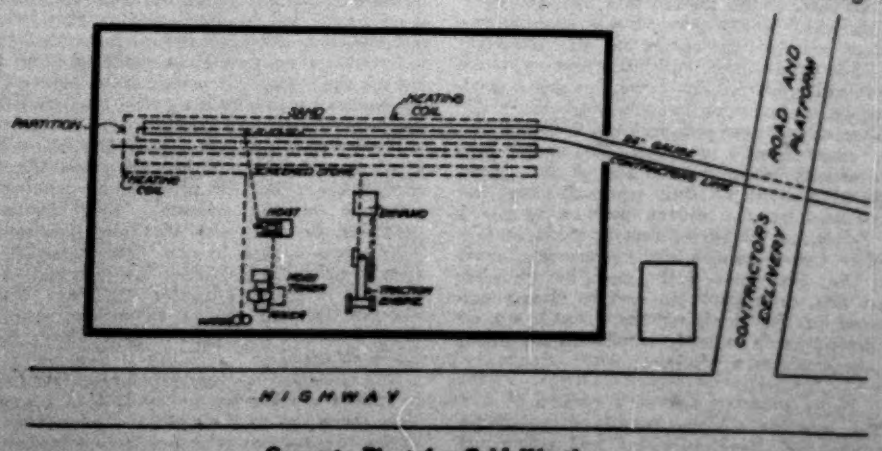
Beyond the concrete plant proper the contractors provided a 5-h.p. electric hoist for dealing with materials, such as brick, mortar, timber, and steel. In addition an electrically-driven circular saw bench was laid down for preparing timber used in the construction of moulds.

As electric power was not available on the site of the works the contractors generated the requisite current by the aid of a 13-h.p. dynamo, driven by a 20-h.p. traction engine.

Materials were brought to the site by a road shown at the right-hand of the plan, the waggons being driven up an inclined timber platform through trap-doors in which their contents could be discharged into trucks running on the contractor's track beneath, the latter being laid on an inclined trestle. The trucks employed were of special design, discharging by a hopper bottom and a side outlet. The contractor's line inside the building was carried by a trestle similar to that outside and close to a partition dividing sand from aggregate.

When the truck was used for delivering gravel a screen was attached below the bottom outlet, the result being that sand found its way through the pebbles to one side of the partition, while the screened pebbles rolled over and collected on the other side. In order to prevent the sand and aggregate from freezing steam pipes were laid on the ground beneath the material heaps, and supplied from the boiler of the traction engine. Exhaust from the coil was led into the vessels used for the supply of water to the concrete-mixer.

The procedure followed by the contractors was generally as described below. While the moulds and brick walls for each story were being erected concrete materials were delivered and transported on the contractor's track to the interior of the building. The steam coil was kept hot so that the sand and stone should be thawed and remain warm until sufficient was collected for the concrete of an entire floor, When all was ready the operations of mixing and depositing concrete were commenced and continued without cessation until the entire floor was completed, thus obviating the bonding of old and new work. As the flooring was



Concrete Plant for Cold Weather.

completed the surface was protected by canvas. this protection, in conjunction with the use of salamanders below the moulds, salt in the water, and warmed materials, eliminating all the troubles usually accompanying the execution of concrete work in frosty weather.

While the building was under construction the temperature for at least fifty days was below 15 deg. F. all day, and sometimes fell to below zero. The erection of this building under severe weather conditions with results stated to compare favourably with those obtained in warm weather shows that with suitable precautions reinforced concrete work is entirely practicable at low temperatures, but it must be borne in mind that the cost is consideraby, above the average.

CHANGES IN RATES OF WAGES:

BUILDING TRADE.

THE eighteenth report of the Board of Trade on changes in rates of wages and hours of labour contains some statistics of considerable interest at a time when public attention has so forcibly been drawn to the question of the workman and his hire. In considering the figures presented in these reports it is essential to bear in mind that the changes in wages referred to are changes in the rate of remuneration of a certain class of workpeople apart from any change in the nature of the work performed. Thus the figures relate only to changes in rates of wages quite distinct from earnings.

In the fifteen years 1896-1910 there have been eight years with rising and seven years with falling wages, but the net effect has been an increase of 353,985*l.* in an ordinary week's pay.

1908 and 1909 were years of falling rates of wages representing respectively decreases per week of 59,171*l.* and 68,922*l.*, but 1910 showed an improvement, with a net increase of 14,534*l.* These being general figures, we may turn more particularly to the building trade.

The report states:—"Employment in the building trades continued slack in 1910, and although the percentage of trade union members unemployed showed some improvement on the previous year, the industry generally remained depressed."

This statement supports our comment (the *Builder*, May 26) on the Budget statement of the Chancellor of the Exchequer, when he represented the building trade to be participating in the general prosperity of the country, and, as we contended, took too favourable a view of the conditions prevailing in this trade.

In the year under review, 1910, the net result of changes in the rate of wages is an increase per week of 377*l.*, as compared with a decrease in 1909 of 713*l.* The number of workpeople affected by any change was, however, only 4,970, or 0·5 per cent. of the number employed. The changes were effected as to 27 per cent. of the persons involved by conciliation and arbitration, and it is particularly worthy of attention that, as regards 4,752 persons, the changes were effected without strike, and only as to 218 persons after a strike.

The net result of changes in hours of labour was a reduction of 4,209 per week, and 12,918 workpeople were affected. The changes were attained by conciliation or arbitration as to 21 per cent. of the persons involved, and only in the case of 109 persons was striking resorted to before the settlement was attained. In this respect the building trade—a most depressed industry—continues to show a good example to far more prosperous trades.

This report does not deal with the amount of employment or unemployment. The figures published in the *Board of Trade Labour Gazette* for July showed some improvement, but the returns made to the Board of Trade, as we have pointed out frequently and as was recognised in the Actuarial Report on the Insurance Bill (see the *Builder*, May 26), only apply to certain classes employed in the building trade, and are an imperfect guide as to the conditions prevailing in the trade as a whole.

A DECEASED BUILDER'S ESTATE.

The late Mr. George Boxall, of Hazelhurst, Pangbourne, Berks, builder and contractor, has left estate of the gross value of 24,157*l.*

An Indian Mortar Mill.

AN INDIAN MORTAR MILL.

THE accompanying illustration depicts an Indian mortar mill, in which the mortar is ground and mixed under a heavy stone roller, which is pulled round in a circular trough by a pair of small bullocks. The trough is only a little wider than the roller, which squeezes much of the mortar out on to the ground on each side. This is scraped back into the trough by a woman coolie, who follows the roller round and round, using a "mamoty," or hoe. In Southern India the roller is usually made of hard gneiss, blocks of which, intended for the same building as that for which the mortar is being prepared, may be seen at the left-hand side of the picture. Very good mortar is made by this machine, which is supremely efficient as regards the application of the power. Almost the whole of the resistance to the pull of the bullocks is that due to the performance of the work of mixing and crushing, and the return of the material by hand results in better mixing than that which would be effected by any but a very complicated mechanical device. Slow movement for men and animals is less tiring than standing still, and the friction of the machine is very small indeed.

A BILL RELATING TO LABOUR DISPUTES.

A BILL has been introduced, presented by Mr. Crooks and supported by members of various parties, to deal with labour disputes, which is deserving of some attention, as its object is to foster conciliation and to obviate disastrous strikes and lock-outs.

The Bill contains forty-six sections, and it is not our intention to examine it in detail. It provides for the constitution of conciliation boards to be appointed by the Board of Trade, consisting of three members—one to be appointed on the recommendation of the employers, one on the recommendation of the employees, and the third on the recommendation of the members so chosen. The expenses of these tribunals would be defrayed out of moneys provided by Parliament. This being the case, it is a matter for comment that the Bill contains no provisions enabling them to enforce their awards, unless, under clause 37, the parties agree in writing that they shall be legally enforceable.

The most important clauses are 32 to 36, which have for their object the prevention of any strike or lock-out prior to, or pending a reference to the tribunals, and imposing penalties for a breach of these provisions. This seems a step in the right direction if such penalties could ever be enforced, but since the Trade Disputes Act the trade unions, the real parties to strikes, are immune from proceedings, and cannot have their funds attached.

The intention of these clauses appears to be to render a reference to arbitration a condition precedent to the right to lock-out or to strike, but as the reference to arbitration is optional, this intention might be expressed in clearer terms. Besides this, as "dispute" is defined in the accepted sense of a difference between an employer and his employees, the Bill would appear to have no application where there is no such difference, but the men come out, or are locked out, because of disputes between other employers and employees, i.e., in the case of general strikes.

Therefore, although the Bill is worthy of attention, it appears hardly adequate to meet the "present distress."

GENERAL BUILDING NEWS.

CHURCH AT WOODSEATS, SHEFFIELD.

This church, to accommodate 600, is in course of erection from the designs of Messrs. C. & C. M. Hadfield. The estimated cost is 7,000*l.* The whole building will not be completed, however, until financial considerations have been overcome.

BAPTIST CHAPEL, PORT TALBOT.

The Calfaria Welsh Baptish Chapel, Port Talbot, was opened at the end of last month. It was designed by Messrs. Evans & Jones, and Messrs. W. P. & E. Williams were the contractors. The building is of stone, and the cost was 1,100*l.*

SCHOOL AT GABALFA.

An infants' school, designed by Mr. D. Pugh-Jones, of Cardiff, has been inaugurated at Gabalfa. The cost of the building was 2,803*l.*, accommodation being provided for 172 scholars. The contractors were Messrs. Knox & Wells, of Cardiff.

NEW SCHOOL, NEWCASTLE.

A new school has been erected at Forest Hall at a cost of about 4,000*l.*, from the designs of Messrs. Hope & Tasker, architects. The contract was carried out by Mr. J. White, of High Barnes Works, Sunderland.

SCHOOL IN WEST FIFE.

Owing to the construction of the Rosyth Naval Base the village of Limekilns has been peopled to such an extent that a new school was considered necessary by the Dunfermline School Board. Accordingly the building—to cost 7,000*l.*—has been begun. The architects are Messrs. Hyslop, Ure, & Beveridge, of Dunfermline. The following firms and individuals are also at work on the school:—Contractors and builders, Messrs. James Stewart & Sons, Dunfermline; joiner, Mr. George Lawrie; plumbers, Messrs. Thomson & Co.; slater, Mr. John Robertson; plasterer, Mr. John Lambert; heating, Messrs. Mackenzie & Moncur; ventilation, Messrs. Donald & Donald; smith work, Messrs. Jas. Bonnar & Son; painters, Messrs. Henry Hoggan & Son.

NEW SCHOOL FOR PENZANCE.

A site near the Public Buildings has been acquired by the Borough Education Committee, who proposed to build on the land a new school to meet the demand of the neighbourhood.

INFANTS' SCHOOL, SALFORD.

Mr. J. B. Broadbent, A.R.I.B.A., is the architect of the infants' school in course of erection in Robert Hall-street, Trafford-road, Salford. A memorial-stone was placed in position last week.

ELEMENTARY SCHOOL, STOWMARKET.

It is proposed by the East Suffolk County Council to provide school accommodation for about 600 children, and a site has been acquired at Stowmarket.

SCHOOLS AT WEST BROMWICH.

Schools, designed by Messrs. Wood & Kendrick, have been built at Hill Top, West Bromwich, on a site formerly occupied by "The Hollies," the residence of the late Alderman Wilson, who interested himself in the foundation arrangements. There are four departments, for boys, girls, junior mixed, and infants, each section accommodating 320 scholars. The cost of the schools was 13,860*l.*, exclusive of equipment.

EXTENSION OF TUBES, LONDON.

Messrs. John Mowlem & Co., contractors, of Westminster, are to execute the construction of the Edgware-road to Paddington tube, and the extension from Charing Cross to the Embankment for the London United Electric Railways.

PORT-GLASGOW STATION.

Plans of a new passenger station were submitted recently to the Port-Glasgow Town Council, and it was decided to assist the Caledonian Railway with their scheme. The proposed new street leading off Princess-street will form an access to the new station.

BUILDING IN LIVERPOOL.

Liverpool, according to the report of the City Building Surveyor, beat no records for building in 1910. Indeed, except in the Walton Division, there was a substantial diminution of enterprise. The 1,710 houses erected was a number less by 439 than in 1909, and 396 below the average of many years. The reason lies possibly in the advent of the garden city of Wavertree and Childwall, which has diverted operations within the city boundary.

PAY OF BUILDERS' LABOURERS.

Employers in the district of Salford have been asked to give to labourers engaged in the building trade an immediate advance of wages, the amounts desired being a fixed minimum of 6d. an hour for all general labourers, including excavators, 6½d. per hour for hod-carriers, and 7d. per hour for scaffolders, mill men, iron fixers, and other special labourers. It appears that many firms already pay such wages to certain of their men, and it is improbable that there will be any difficulty in adjusting the matter. Contractors who have based their estimates on the previous rates of pay, may, however, seek to postpone the alteration.

SEASHORE, KNOTT END, FLEETWOOD.

An esplanade is being made at Knott End from the plans of Mr. T. A. Drummond, Surveyor to the Quail Holme Estate, and Mr. J. H. Monk, Surveyor to the Preesall Urban Council. Schemes have been suggested for many years, but it is only recently that the various local interests have been brought together. The length of the esplanade will be 400 yards, and its width will range between 45 ft. and 110 ft.

HOUSE COLLAPSE IN THE WEST END.

While the site of a building, recently demolished in Great Portland-street, was being cleared a house adjoining, though shored up, collapsed, and the workmen but narrowly escaped.

TRADE NEWS.

Under the direction of Messrs. N. W. Harrison, F.R.I.B.A., and G. A. Harrison, M.S.A., Oxford, the "Boyle" system of ventilation (natural), embracing Boyle's latest patent "air-pump" ventilators and air inlets, has been applied to George-street Congregational Church, Oxford.

Messrs. Stanley Jones & Co., whose factories at Shepherd's Bush have been extended recently, have just secured the order for the entire installation of showcases, etc., in the new stores of Messrs. Katz Brothers, Ltd., at Singapore. The amount of the contract is about 10,000*l.*

The New Hospital, Atherstone, is being supplied with Shorland's warm-air ventilating patent Manchester stoves, by Messrs. E. H. Shorland & Brother, Ltd., of Failsworth, Manchester.

Messrs. O'Brien, Thomas, & Co., Upper Thames-street, London, and Excelsior Works, South Bermondsey, have recently supplied three of their D. O. Boyd's roof ventilators for the new dining and refreshment rooms at Immingham Dock, near Grimsby.

A new hospital is being erected at King's Lynn, the contractors being Messrs. Hall & Lawson, King's Lynn. The two lifts are being carried out by the Lift and Hoist Company, Premier Engineering Works, Deptford, S.E.

PROJECTED NEW BUILDINGS IN THE PROVINCES.*

ABBEYDORE.—Repairs to parish church (470*l.*); Rector of Abbeydore.

Aberdeen.—Additions to slaughter house, Hutcheon-street, for the Aberdeen Flesher Incorporation.

Aberystwyth.—Parish hall; Churchwardens, St. Michael's, Aberystwyth.

Billingborough.—Alterations and improvements at the Vicarage: the Vicar.

Bingley (Yorks).—Public baths, Myrtle-park; Mr. H. Bottomley, Surveyor, Bingley Urban District Council.

Birmingham.—Sanatorium, near Birmingham; Messrs. Martin & Martin, architects, Colmore-row, Birmingham; Messrs. Lowe & Son, builders, Burton-on-Trent. Additions, Ansell's Brewery; Messrs. Inskip & McKenzie, architects, Bedford-row, W.C.; Mr. W. J. Whittal, builder, Lancaster-street, Birmingham. New ropeworks for Messrs. Wright; Messrs. R. Fenwick, Ltd., builders, William Edward-street, Birmingham.

Bispham.—School chapel; Trustees of the Bispham Congregational Church.

Blaengarw.—Hall (1,000*l.*); Vicar, St. James', Blaengarw. One hundred houses for the International Coal Company. Blaengarw.

Blidworth.—School (7,000*l.*); Mr. L. Maggs, architect, Shire Hall, Nottingham.

Bolton.—Extensions, Townley's Hospital (30,000*l.*); Mr. H. I. Cooper, Clerk, Board of Guardians, Bolton.

Brigg.—Alterations to factory for Messrs. Spring & Co.

Broughton (Manchester).—Extensions to North Manchester New Church, Bury New-road; the Vicar.

Burbage.—Institute, Bishops-lane (1,612*l.*); Messrs. Robinson Bros., builders, Burbage.

Collington.—School, Launceston-road; Mr. W. J. Martin, builder, Drakewalls.

Cuckfield.—Parish hall; Rev. J. L. Stewart, Cuckfield.

Dearnley.—Home for nurses (5,500*l.*); Mr. H. Clough, architect, Rochdale; Mr. R. Kay, builder, Rochdale.

Dowlais.—Proposed extensions to Wimborne baths; Mr. T. F. Harvey, Surveyor, Merthyr Tydfil Town Council.

Dundee. — Training college, Park-lane (60,000*l.*); Mr. F. M. Cappon, architect, Bank-street, Dundee.

Durham.—Hall (1,020*l.*); Pastor, Presbyterian Church, Durham. Extension to Union Offices (840*l.*); Mr. C. B. Smith, care of Mr. H. E. Ferens, Clerk, Board of Guardians, Durham.

Durrington.—School; Mr. J. Powell, County Hall, Trowbridge.

Eastbourne.—The following plans have been passed:—Marine Hall, Seaside, for Mr. J. Steinlé; Mr. Andrew Ford, architect. Additions, "Holyrood," St. Anne's-road, for Mr. J. K. Brydges; Mr. P. D. Stonham, architect. House and garage, Prideaux-road; Messrs. Peerless-Dennis & Co., builders. Additions to premises, Lismore-road, for Messrs. Bobby & Co.; Mr. Andrew Ford, architect; Messrs. M. Martin & Sons, builders. Four houses, Desmond-road; Mr. A. Chandler, architect; Messrs. Foord & Pellett, builders.

Eccles.—Three houses, Corporation-road; Messrs. Thomas Moore & Son, builders, 22, Monton-road, Eccles.

Edinburgh.—Ice rink, West Tollcross, for the Edinburgh Ice and Cold Storage Company, Ltd.

Embsay.—Church, Moor-lane; Architect, care of the Swedenborgan Trustees.

Falkirk.—Board-room, etc., Dalderse-avenue (1,800*l.*), for the Bainsford and Grahamston Co-operative Baking Society.

Ferryhill.—Alterations and extensions to club for the Ferryhill and District Workmen's Club.

Freckleton.—Bank premises, The Green; architects, care of the Directors, Manchester and Liverpool District Bank.

Frinton-on-Sea.—Free church (4,500*l.*); Mr. W. Hayne, architect, Frinton-on-Sea; Messrs. Potter & Son, builders, Chelmsford.

Gellifaelog.—Proposed 300 houses: Mr. T. F. Harvey, Surveyor, Merthyr Corporation.

Gerrard's Cross.—Bank; Architects, care of the Directors, Messrs. Barclay & Co.

Golcar.—Additions to Heath House Mills for Messrs. Thorpe.

Greenock.—Alterations to the West Parish church; the Pastor.

Halifax.—Improvements to the Crossley and Porter Orphanage (2,000*l.*); the Governors.

Harwich.—Theatre, King's Quay-street; Mr. C. Thurston, Harwich.

Hebburn.—Offices for Messrs. Hawthorn Leslie, & Co., shipbuilders; Messrs. J. & W. Lowry, builders, Corporation-street, Newcastle-on-Tyne.

Howden.—Alterations to workhouse; Mr. H. Green, Clerk, Board of Guardians, Howden.

Keighley.—Sunday school; the Pastor, Victoria-park, Wesleyan Church.

Launceston.—Generating station adjoining London and South-Western Railway Station, for the Launceston and District Electric Supply Company.

Leeming Bar.—Proposed church; Rev. B. Peirse, Leeming Bar.

Limbury. — School; Messrs. Gotch & Saunders, architects, Market-place, Kettering.

Llanhilleth (Mon.).—Fifty houses; Mr. D. J. Loughor, architect, Pontypool.

Locks Bottom (Bromley).—Proposed extensions to workhouse (12,000*l.*); Architect, care of Mr. E. Haselhurst, Clerk, Board of Guardians, Bromley.

Londonderry. — Grain silo; Messrs. J. Ballantine & Co., builders, Strand-road, Londonderry.

Lowestoft.—Beach school; Messrs. Oliver & Chetwood, architects, Bloomsbury-square, W.C.

Lytham.—Club-house for the Lytham and St. Anne's Golf Club (3,100*l.*); Mr. G. H. Willoughby, architect, 48, Parr's Bank-buildings, Manchester; Messrs. Dryland & Preston, builders, 20, Clifford-road, Blackpool.

Malton.—Workhouse laundry; Mr. C. H. Channon, architect, care of the Guardians, Malton.

Mansfield (Notts).—Additions to workhouse; Messrs. Vallance & Westwick, architects, Mansfield; Messrs. Moore & Son, builders, Mansfield.

Monkton.—New school; Mr. W. Reid, architect, Monkton.

Nanthir.—Fifty houses; Mr. Sansome, builder, Blaengarw.

Newcastle-on-Tyne.—Building Dove House, also business premises, Northumberland-street; Mr. Henry Gibson, architect, Dean-street, Newcastle-on-Tyne.

Newcastle (Staffs).—Business premises, also new premises for Messrs. Coop & Co., Ltd.; Mr. H. Booth, architect, 42, Regent-street, Haslingden; Messrs. Broadhurst & Son, builders, High-lane, Burslem.

Old Whittington.—County school; Mr. J. H. Bockett, builder, Mansfield, Notts.

Oswestry.—Almhouses (1,400*l.*); Mr. J. C. Vaughan, builder, Oswestry.

Penrith.—Grammar school; Messrs. Harrison & Ash, architects, Newcastle-on-Tyne.

Perry Barr (Birmingham).—School; Mr. Hutchings, County Hall, Stafford.

Port-Glasgow.—Bank (8,000*l.*), for the Union Bank of Scotland: Messrs. George Arthur & Son, builders, Airdrie.

Redditch.—School (6,425*l.*); Mr. A. V. Rowe, architect, care of Mr. A. W. Priestley, Secretary, Education Committee, Worcestershire County Council, Worcester.

Rhosddu.—New church; the Vicar, St. James', Rhosddu.

Rochdale.—Alterations to wood mill for Messrs. A. Mosley & Sons.

Ropley and Sholing.—Schools; Mr. W. J. Taylor, The Castle, Winchester.

South Crossland.—Extensions and additions to Cocking Steps Mill for Messrs. John Wigley & Sons.

South Shields.—Two school departments, Stanhope-road (8,450*l.*); Mr. J. L. Miller, builder, Albion-road, North Shields.

Southwick.—Isolation hospital; Surveyor, Southwick Urban District Council.

Stoke-on-Trent. — Electric power station (5,120*l.*); Mr. Wardle, builder, Longport, Stoke-on-Trent.

Viewforth.—School (8,000*l.*); Mr. J. A. Carfrae, architect, 3, Queen-street, Edinburgh.

Walsall.—Business premises, Park-street; Messrs. Hickton & Farmer, architects, Bridge-street, Walsall.

Walton (near Peterborough).—Factory for Messrs. Frederick Sage & Co.; Mr. A. W. Ruddle, architect, Peterborough; Mr. J. Cracknell, builder, Peterborough.

Warrington.—The following plans have been passed:—Office, etc., off Longford-street, for the Warrington Steel Foundry Company, Ltd. Garage, Powell-street, for Messrs. J. Patterson & Sons. Extensions to works, Bewsey-road, for the Warrington Wire Rope Company.

Winchcombe. — Proposed twelve houses, Greet-road (3,000*l.*); Mr. T. Smith, Surveyor, Winchcombe Rural District Council.

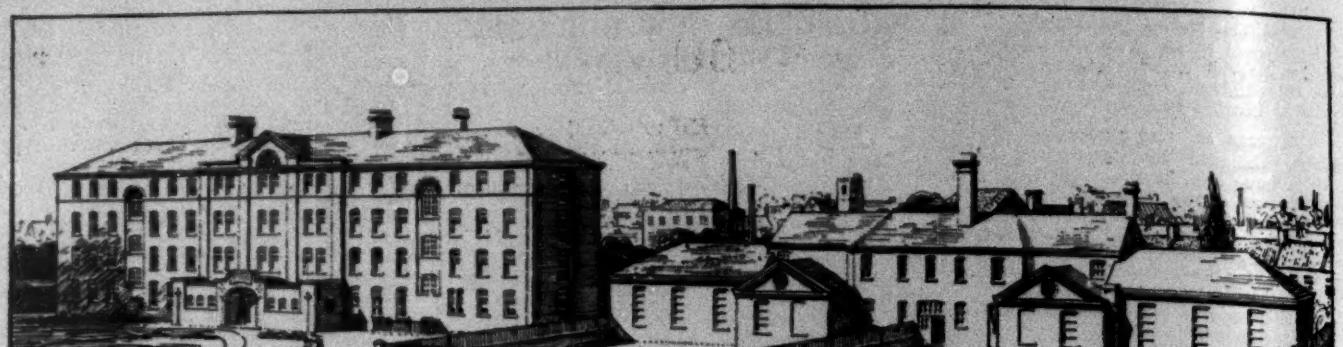
Wood End (near Birmingham).—Residence; Mr. B. J. Emery, architect, 109, Colmore-row, Birmingham.

Woodlands. — Church (7,000*l.*); Messrs. Mullins & Richardson, builders, 5, Shotton-street, Doncaster.

* See also our list of Competitions, Contracts, etc., on another page.

THE LATE MR. JOHN SHAW.

The late Mr. John Shaw, of Wirksworth, Derbyshire, stone merchant, of the firm of Messrs. Bowne & Shaw, who died on July 8, aged 90 years, was one of the pioneers of the limestone quarrying industry in that county. His estate is of the gross value of 35,390*l.*, with net personalty sworn at 22,841*l.*



NURSES' HOME AND SHORT-PERIOD LUNATIC WARDS, HACKNEY UNION INFIRMARY.

THESE buildings are about to be erected on vacant land adjoining the Infirmary, and approached by a private road dividing the latter from the Workhouse. The main part of the lunacy wards is one story in height, with a second story containing quarters for male nurses above the centre of the block, the staircase approach forming a division between the accommodation for male and female lunatics. Below this building is a heating chamber working both blocks. The nurses' home has a subway connexion from the infirmary passing beneath the lunacy wards. The centre portion of the ground floor is devoted to sitting-rooms for the nurses and sisters; the remainder of this floor and the whole of the upper stories being devoted to nurses' bedrooms, bathrooms, boxrooms, and linen storage; 101 bedrooms in all are provided. Both buildings will be of fire-resisting construction. Airing yards for male and female lunatics occupy the space east of the lunacy wards, west of which is the male officers' recreation-ground. The space on the west of the nurses' home is devoted to a nurses' recreation-ground. A cycle store will be provided as a detached building against the boundary wall. The tender of Messrs. F. & T. Thorne, of Poplar, amounting to 19,465*l.*, has been provisionally accepted for the work. The architect is Mr. W. A. Finch, of 76, Finsbury-pavement, E.C.

THE ROYAL COMMISSION ON SEWAGE DISPOSAL.

THE Seventh Report of the Royal Commission on Sewage Disposal, just issued, seems to possess, in some respects, features of wider interest that those previously published, and for that reason may appeal to a larger public than is usual with works of this character, however important the subject matter may be to the body politic.

Naturally, anything emanating from such a source as the volume under consideration will be of interest to those more professionally concerned in the science of sewage "treatment" and disposal, embracing, as it does, within that category not only sewage and municipal engineers, chemists, and bacteriologists, but municipal and public health officials generally. This Report will, however, doubtless be of interest to a wider public, and even the scientifically-disposed "man in the street" will find much to attract him in the descriptions of the means used for the unveiling of some of Nature's secrets which this publication contains, and may consequently welcome any matter calling his attention thereto.

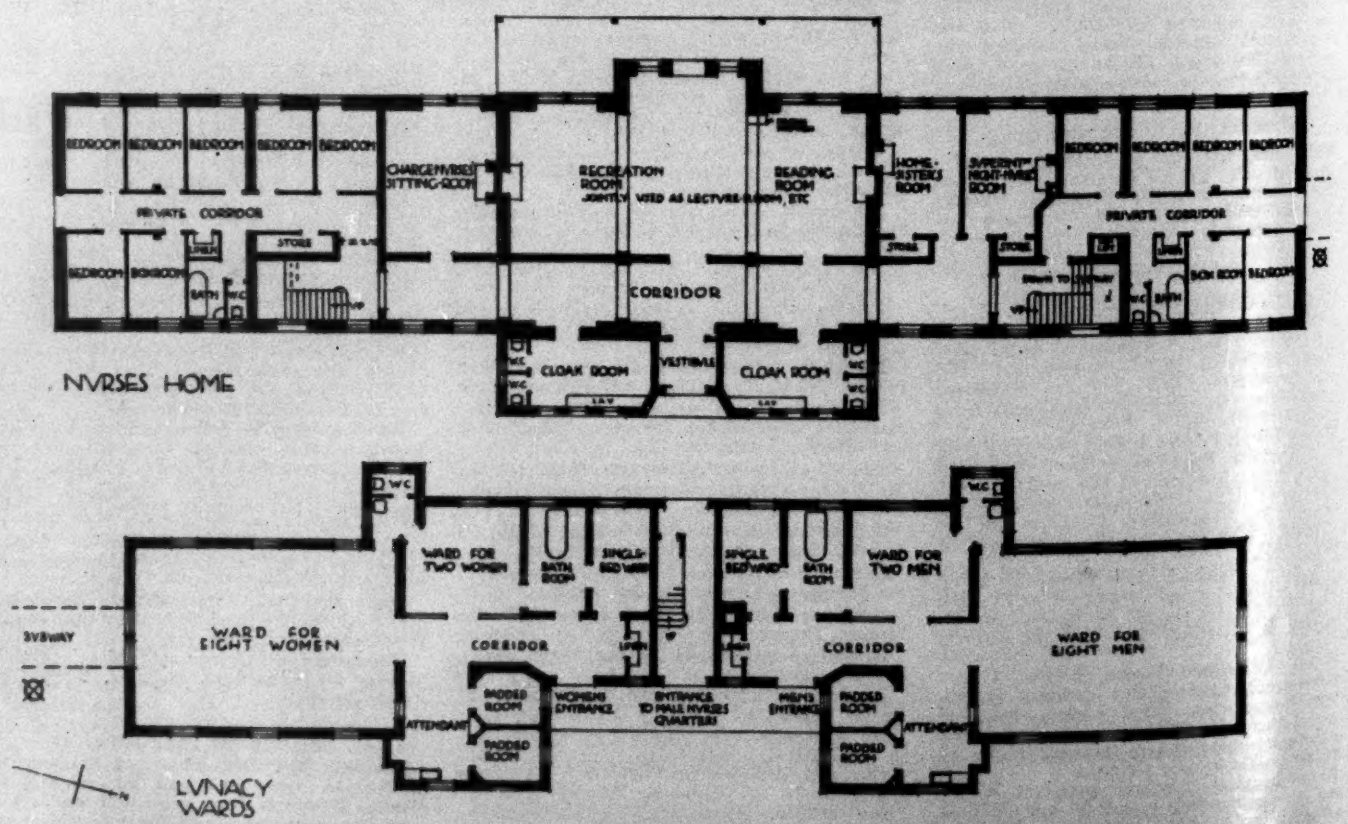
The just issued Blue Book—Volume II., Appendices, Part I.—contains the minutes of evidence, and very detailed reports to the Commission in reference to growth of green seaweeds in sewage-polluted estuaries; though, on looking more fully into the matter, it is realised that pollution can similarly take place in the open waters of the sea coasts. The subject possesses at least a threefold aspect, because, not only has it a bearing upon the discharge of crude sewage or imperfectly "treated" effluent into estuaries, and the possibility of detrimentally affecting the shores upon which the various currents may carry it, but there is in such a case the consequent interference with the amenities of riparian communities and private owners; and, in addition, the pollution of any shell-fish layings and other infringements of the Rivers Pollution Prevention Act, 1876, which applies to the United Kingdom.

As regards the legislative aspect of the subject, it has to be admitted that, although some five-and-thirty years have passed since the 1876 Act was placed upon the statute book, yet even now scientific knowledge does not enable satisfactory compliance with its requirements in every case, and the example before us exemplifies this.

The present publication is of especial interest to local sanitary authorities whose areas are situated either upon the sea coast or on estuaries or arms of the sea, because of the effect of the discharge of crude sewage or of effluent upon the water therein; and, further, the consequences of their reaching neighbouring coasts.

Briefly, the Report, minutes of evidence, and the numerous tables which it also contains, concerns the action both of "untreated" and "treated" sewage upon sea water, in estuaries, and on the sea coasts, and the evidence and experiments, whilst dealing more especially with the waters of Belfast Lough, also included experiments in the vicinity of the Giant's Causeway and on the Devonshire coast.

This work originated consequent on a serious effluvium nuisance which had occurred for



Hackney Union Infirmary: Nurses' Home and Lunacy Wards.
Mr. W. A. Finch, Architect.

many years in Belfast Lough, and which led to the Belfast Corporation Act, 1899, containing provisions under which the Corporation had to provide works, within three years, for the proper purification of the sewage of the city. Circumstances, which the following may perhaps explain, have militated against these requirements.

Up to then the only "treatment" which the Belfast sewage had received was by screening and sedimentation, a process still carried out failing decision as to the most satisfactory method to employ to prevent a recurrence of the nuisance.

The nuisance in question, it had been established by investigation and experiment, could be referred entirely to rotting green seaweeds, the chief of which being the *Ulva latissima*. Though this class of seaweed can grow in pure sea water, there seems to be every indication that the growth is remarkably tardy compared with that in sewage-polluted sea water. The spring and summer months are conducive to its growth (experiments showed an increase of 23 per cent.), and these seasons coincide with the periods of greatest nuisance from effluvium from pollution of all kinds.

Fresh ulva taken from mudbanks in Belfast Lough, the chief nursery there of this species of marine algæ, and where the sea water flowing over which is polluted to the extent of 1 per cent. with Belfast sewage (as measured by the ammoniacal nitrogen), was found to contain over 4 per cent of sulphur, as compared with 0·4o per cent. in sewage sludge.

(It may be mentioned that Professors Adeney and Letts, and others, are of opinion that 1 per cent. of sewage is not likely to be exceeded in most cases of seaside pollution at a measurable distance from the outfall.)

In the opinion of Professor Adeney, the cause of the nuisance in Belfast Lough is not to be ascribed to sewage putrefaction, but to the putrefaction in the presence of sea water of marine algæ, the growth of which has been stimulated and promoted by sewage matters.

Ulva latissima grows luxuriantly in sewage-polluted water, but, curiously, it is but little found where there are great quantities of sewage, as at an outfall, because it could not well exist there; it would, in fact, be smothered.

There seems no doubt but that not only in sea water at places in the British Isles, but on the Continent, the presence of a certain kind of green seaweed, the *Ulva latissima*, is evidence of sewage pollution. At the same time it seems clearly established that purified sewage is also conducive to the growth of ulva.

It appears that there is a decidedly interesting feature in connexion with the ulva in that they require something to which to attach themselves, and besides being found on rocks or other solid bodies they show a predilection for the shells of mussels (either dead or alive). Live mussels attach themselves to them by "byssus" threads, which they throw out. Mussels are often found in polluted waters; indeed, they seem most prolific therein, and appear to deliberately attach themselves to the ulva.

Professor Letts suggests some sort of symbiosis of the ulva and the mussel that mussels eats the small creatures which are attracted by the mussels.

In situations where sewage effluents have to be discharged into sea water there seems every indication that the removal or destruction of mussel beds will bring about the prevention of the growth of the *Ulva latissima*, for the production of which they form great nurseries, and thus prevent the annual rotting of the ulva and consequent nuisance.

Farmers occupying lands in the vicinity of the ulva growth in Belfast Lough take a certain amount away in carts to put on the land as manure.

The difficult point to determine, however, is the means to employ to get rid of the mussels. Experiments at Belfast with sulphate of copper on an area of 37 acres densely covered with mussels, and where ulva had commenced their annual growth, had no lasting effect. Where mussels, however, were buried in trenches, the particular area has, in the words of Mr. H. A. Cutler, M.Inst.C.E., the Belfast City Surveyor, "practically ceased to be a nursery for growing weed, and that the organic mud has disappeared"

With regard to the effect of clearing off mussels in greatly reducing the growth of *Ulva latissima*, Southend is an interesting and useful case in point, for, as a result of such clearance, the ulva was washed away by the tides.

The subject is one to which much knowledge has been added by the investigations of the Royal Commission, but its labours should by no means end with the Report just issued, for it is a matter of much importance to all sanitary authorities whose areas are situate on estuaries and the sea coasts, as well as riparian owners and proprietors of edible shellfish layings so situated.

HOUSING IN MIDDLESEX.

Dr. C. W. F. Young, the Medical Officer of Health for Middlesex, gives some interesting information in his annual report, which has just been issued, with regard to the housing question in the county. He summarizes reports which have been received from the district medical officers of health in relation to the Housing and Town Planning Act, and the question generally, as follows:—

Acton.—Dr. Thomas states that it is proposed early in each year "to draw up a list of houses which have shown an excessive mortality and a high infantile mortality in the previous year, and to these will be added others which, for some special reason, *e.g.*, unusual incidence of infectious disease, appear to need inspection." In commenting upon some of the streets inspected he states:—"It will be observed that some of the streets have been comparatively recently erected, and yet the percentage of sanitary defects in these houses is almost as high as in the older property."

Brentford.—Dr. Bott states that under the Housing and Town Planning Act it has been found possible to deal more expeditiously with insanitary property.

Chiswick.—The system previously in force here has needed but little alteration to comply with the requirements of the regulations under the Act. Attention is drawn by the Medical Officer of Health to houses in Essex-place, which, at the date of his report, were uninhabitable.

Edmonton.—Closing orders under sect. 17 of the Housing Act were made as regards eighteen houses. Six houses were otherwise closed and fifteen houses were demolished by the owners.

Enfield.—Action has been taken for instituting systematic house inspection. During the year four houses were closed.

Finchley.—The system of house to house inspection previously carried out practically meet the requirements of the regulations under the Act.

Friern Barnet.—Dr. Spreat writes that the housing accommodation in the district is adequate.

Hampton.—The housing accommodation is reported to be adequate. Sixty-five houses erected by the Council a few years under Part III. of the Housing Act "have been almost fully occupied during the whole of the year."

Hampton Wick.—Arrangements have been made to carry out the regulations in an efficient manner.

Harrow.—Several houses were voluntarily closed by owners after notice had been served on them to carry out needful repairs.

Hayes.—In this district the housing question assumed an urgent condition, owing to an influx of workers, and the fact that many houses are in an unsanitary state. The district medical officer writes that the housing accommodation is very inadequate. Owing to several large factories having been built at Botwell, cottage property of a rental of from 5s. to 7s. 6d. per week were in great demand. Numbers of workers at the factories reside outside the district. In the houses in that portion of the district near the factories there was considerable overcrowding. A number of cottages were in an unsanitary condition, but before anything could be done in the way of closing them other accommodation would have to be provided.

Hendon (Urban).—In commenting on the class of houses which are being built in the district, Dr. Andrew says they are not specially suited to persons of the working class, and that the question of erecting accommodation for same has been for some time under the consideration of the Council.

Heston and Isleworth.—Dr. Buchan, referring to the recently-issued regulations of the Local Government Board as to inspection of houses, urges that additional powers are needed in connexion with (1) the absence of proper storage for and the preparation of food; (2) the paving and drainage of courts, common to more than one house; and (3) the cleansing of cellars, etc. He suggests draft clauses for insertion in a local Bill in 1912.

Ruislip-Northwood.—In May the Council received plans for the development of certain areas in the district; they then considered the advisability of a town planning scheme. The Housing and Town Planning Committee reported in August. The Council then gave the Committee authority to prepare all necessary plans, and call Conferences, and do such other acts as might be necessary to make application to the Local Government Board for authority to prepare a scheme. On November 30 the first Conference of landowners was convened. In December plans and evidence were ready to be submitted to the Board, and at the close of the year the Council were only waiting for an inquiry to be held by the Board as to the advisability of preparing a scheme.

Southall-Norwood.—There is ample accommodation in the district for the working classes.

Southgate.—Thirty-four workmen's cottages in Tottenhall-road have been erected by the Council.

Staines (Urban).—The housing accommodation is adequate for the needs of the district.

Sunbury.—There is no lack of accommodation for the working classes, houses being unoccupied.

Twickenham.—Closing orders were made in regard to twenty-three houses. Ten of these had been demolished, and the remainder were rendered fit for habitation.

Uxbridge (Urban).—Dr. Lock says that the death rate in the parish compares unfavourably with an adjoining district, and he proposes to make recommendations to his authority for the improvement of the housing conditions. There is need of cottages at a rental of under 6s. per week.

Wembley.—One house was closed, and in three other instances the owner closed houses on learning that the local authority proposed to take action.

Willesden.—Thirty-five notices were served under sect. 15, and six under sect. 16 of the Housing Act, 1909. Four closing orders under sect. 17 were issued.

Wood Green.—Nine houses were repaired and made fit for habitation, and sixteen houses were demolished by the owners without the local authority having recourse to the powers under the Housing Act.

LONDON COUNCILS.

Shoreditch.—The Lighting Committee have decided to convert all the street lamps north of Old-street (1,055 in all) from gas to electricity. The capital cost of laying about fourteen miles of cables in 160 streets of sufficient size to serve not only for the street lamps, but to meet any reasonable demand likely to arise, is put approximately at 8,385*l.*, while the cost of converting the lamps for electric lighting is estimated at 665*l.* The work is to be done gradually.

Wimbledon.—The following plans have been passed:—Britannia Incandescent Mantle Company, Ltd., additions, rear of mantle works, Ravensbury-road; Messrs. Holloway Brothers, additions to hospital, Thurstan-road; Mr. W. Miles, additions, "Kelvinside," Malcolm-road; Messrs. Ogden, Sons, & Olley, motor garage, Grosvenor-hill; Mr. Melville S. Ward, additions, "Rusthall," Parkside.

LAW REPORT.

Breach of Building By-Laws: Doncaster Architect Fined.

An interesting case was heard at the Doncaster Borough Police Court on Monday, when Mr. Thomas Henry Johnson, of Priory-place, one of the best-known architects and surveyors in the town, was summoned for two offences against the Doncaster Corporation Building By-laws.

The Town Clerk, who prosecuted on behalf of the Corporation, stated the offences consisted of building contrary to plans which had been approved by the Sanitary Committee, and of making substantial additions to a building without submitting any plans at all.

In March last Mr. Johnson submitted plans for a shop and temperance hotel in Frenchgate. The plans showed walls 9 in. thick, whereas they should have been 13½ in. thick. Amended plans were passed on March 28, but on August 11 the Borough Surveyor discovered that the third story of the building had only a 9-in. external wall instead of the 14-in. shown on the plan. Over and above this a very substantial addition had been made to the premises, six bedrooms, bathroom, and water-closet having been added without any plans being submitted. The Surveyor wrote, asking defendant to discontinue operations, but the work had continued up to the present time. He asked the Bench to inflict a substantial

penalty, and also a continuing penalty from August 11.

Mr. Williamson, of Retford, who defended, pointed out that it was unlikely in a building which was to cost 7,000*l.* a man would wilfully break the by-laws in order to save 15*l.* The mistake was due to a series of unfortunate circumstances, and in the negotiations defendant had always said he was willing to put right anything that was wrong. Owing to a change of clerks in defendant's office the wrong plans were sent to the contractor, and defendant was actually paying for a 14-in. wall whilst a 9-in. wall had been erected. He was still prepared to put the error right.

The Bench imposed a fine of 2*l.* 10s. in each case.

FOREIGN AND COLONIAL.

Demand for Concrete Mixers in Spain.

According to an American Consular Report, large quantities of concrete are being used in Seville, where the operation of mixing is done by hand; but the opinion is expressed that machinery would find ready sale if introduced by enterprising firms. Another reason making this outlet a promising one for makers of concrete mixers is, that in the preparatory work and building now going on, and the improvements in the city that will be made for the Spanish-American Exhibition to be held in Seville during the year 1914, concrete will find very extensive use.

Collapse at Viterbo.

A correspondent of the *Morning Leader* reports that on the 24th ult., at Viterbo, near Rome, seven houses suddenly collapsed "as if they were a pack of cards." Several persons were seriously injured. No earth tremor was felt, nor was there any other apparent cause of the disaster. Civil engineers sent by the Government say that many other houses threaten to collapse and must be abandoned.

Progress of Chicago.

According to a report from the British Consul in Chicago, the building figures of that city for 1910 show a remarkable increase over those of 1909, and are the largest hitherto recorded. Permits were issued during 1910 for construction of 11,409 buildings, involving a total outlay of 19,958,125*l.*, as compared with 11,241 buildings, costing 18,644,900*l.* in 1909. Improvements effected by the city of Chicago included an expenditure of 429,400*l.* on the new City Hall during 1910; also 100,000*l.* on paving repairs.

New Fruit Market, Milan.

The spacious market opened this year in Milan replaces several fruit and vegetable markets previously held in the centre of the city. The new buildings cover a site about 1,300 ft. long by 650 ft. wide, in communication with the goods stations by means of a branch line. The warehouses are disposed in the form of two concentric circles around the central buildings. The interior warehouses are reserved for wholesale business, and those in the outer circle are devoted to retail trade, conveniently arranged shops being provided for occupation by dealers. The inner buildings are spacious steel frame sheds, 65 ft. wide by about 26 ft. high, and the outer buildings are of masonry construction. The interior of the new market includes a hotel and a restaurant, as well as stables for the use of cultivators who send in their produce by road, and are obliged to remain some time in the city. The market was established by the municipality, and forms one of the most useful among the various improvements effected within recent years in the commercial capital of Italy.

TRADE CATALOGUES.

We have received from the "Peerless Heater" Company, of 70 and 71, Bishopsgate-street Within, a booklet describing the "Peerless" gas-heated kitchen boiler. It is claimed that the "Peerless" will heat more water and keep it hot, on a smaller consumption of gas, than any other heater. The parts are simple, and there is little to get out of order. For country house use, where there is no gas, a gasolene burner may be attached, and the results are precisely the same as where gas is used. The extremely moderate price at which it is supplied, and the sound principles and simplicity of its design, should ensure for it a steady and increasing popularity.

Messrs. Mander Brothers, of Wolverhampton, and Noel-street, Oxford-street, London, W., forward us a booklet dealing with their well-known decorative specialities. Specimens are given of this firm's well-known "Suffield" greens, which will, it is claimed, stand all weathers without loss of colour. It is made in ten shades, and, when mixed with white, is susceptible of many rich and beautiful tints. The "Olsina" water paints are particularly deserving of the attention of our readers. Besides being specially adapted for schools, hospitals, and public and buildings generally, they can also be tried on ironwork, such as radiators, hot-water piping, steamship funnels, etc. "Olsina" is made in one hundred different shades, and may be varnished to form a suitable wall decoration for bathrooms. Among the firm's other specialities we desire to call attention to the "Matsine" transparent colours, which may be used as a stain on new woodwork, as a "scumble" on painted work (by this method, when applied on different ground colours, the characteristics of many rare woods may be reproduced), or as a glaze on the top of old grained work. Messrs. Mander's varnishes are well enough known to need no encomium from us.

PATENTS.

APPLICATIONS PUBLISHED.*

11,246 of 1910.—Domingo Desplats: Device for retaining doors, windows, and the like in an open position.

18,715 of 1910.—James McLellan: Apparatus for simultaneously heating and coating the surfaces of stone, brick, earthenware, concrete, metal, and hardware articles of all kinds with metals and vitreous materials.

18,716 of 1910.—James McLellan: Process for coating the surfaces of stone, brick, earthenware, concrete, metal, and hardware articles of all kinds with metals, vitreous materials, and the like.

19,003 of 1910.—William John Dunn: Door locks.

20,782 of 1910.—Joseph Freeman Goddard: Concrete and like compounds.

21,322 of 1910.—William Duggan: Apparatus for closing doors and gates.

21,600 of 1910.—Edgar Newton: Means for the connexion and fixing of taps for baths, basins, sinks, and the like.

22,866 of 1910.—Gottfried Obrist, Wilhelm Obrist, and Alphons Obrist: Uniting of glass panes.

23,257 of 1910.—William Henry Richardson: Air inlet valves for drains.

24,643 of 1910.—Otto Buchholz and Alfred Buchholz: Guard for the top openings of the waste pipes of roofs.

86 of 1911.—William Julius Baltzer: Forming concrete bodies in moulds.

984 of 1911.—Professor Dr. Wilhelm Schneidewind and Dr. Drietrich Meyer: Apparatus for opening and closing doors.

6,665 of 1911.—Heinrich Christophory: Door or window handles.

7,075 of 1911.—Frank McMurray Sawyer: Construction of walls, columns, and the like.

7,375 of 1911.—Frank Hine Willis: Fire-resisting floors.

8,025 of 1911.—Ludwig Schiff: Door-securing devices.

9,634 of 1911.—Frederick James Marchment and Edward John Farrell: Wall-ties.

11,532 of 1911.—Erwin Marshall Hilton, Albert Veitl, and Alfred Henry Levigneur: Means for securing sheets of glass to window frames and the like.

SELECTED PATENTS.

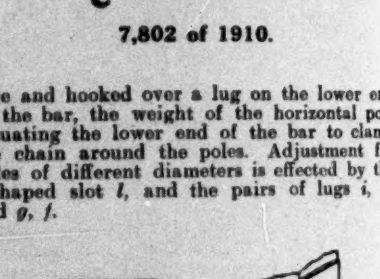
7,667 of 1910.—Alfred Lee Moorshead: Railway station roofs.

This relates to railway stations wherein the roof is supported on columns placed between adjacent tracks, so as to leave the platforms unobstructed, and a minimum space is provided above the engine funnels so that the smoke may quickly escape. Subways for goods or local trains may be built under the platform. A sectional elevation of one form or roof is shown, also an enlarged detail. The columns 12 are arranged between the pairs of tracks 10, and support the roof principals 15. Baffle-plates deflect the smoke through apertures 26. Skylights 21 extend on each side of the ridge of each span, with or without impervious roofing. The valleys are covered by portions 24, which are carried by brackets on the longitudinal girders. Rain-water is drained off by gutters leading to fall pipes adjacent to alternate columns. The entire framework consists of steel plates and angle bars riveted together and covered with concrete.

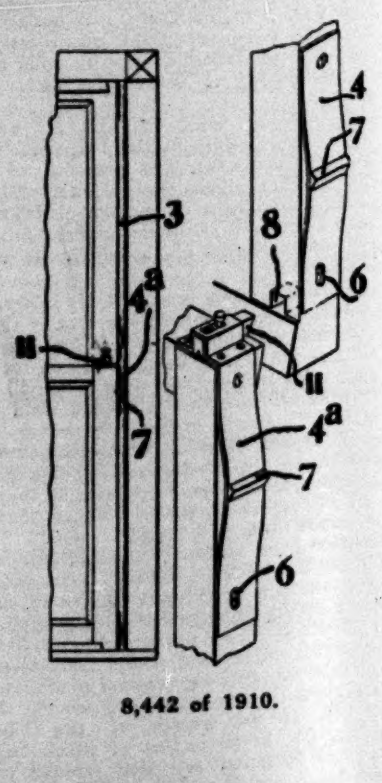
7,667 of 1910.

7,802 of 1910.—Ludwig Pollaert: Scaffolding.

This relates to a scaffold-securing device wherein the scaffold poles are secured together by chains *c*, each having one link *d* permanently connected to a slotted clamping-bar *e*, the chain being passed round the vertical pole, hooked over a lug on the upper end of the bar, and then passed round the horizontal pole and hooked over a lug on the lower end of the bar, the weight of the horizontal pole actuating the lower end of the bar to clamp the chain around the poles. Adjustment for poles of different diameters is effected by the J-shaped slot *l*, and the pairs of lugs *i*, *k*, and *g*, *f*.



7,802 of 1910.



8,442 of 1910.

8,442 of 1910.—Kennis Faro Deskins: Window holders.

This relates to window frames wherein sliding sashes are held in any position by the

PATENTS—Continued on page 283.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xvii.; Auction Sales, xxii.

Certain conditions beyond those given in the following information are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

*** It must be understood that the following paragraphs are printed as news, and not as advertisements; and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that may occur.

Competitions.

SEPTEMBER 9.—**Fforest-fach.**—Parish hall, to cost 1,200*l.* Premium 5*l.* 5*s.* Particulars from Mr. H. Plant, 14, Fisher-street, Swansea.

SEPTEMBER 9. — **Pontefract.** — SWIMMING-BATHS.—Open to architects of the West Riding of Yorkshire. Particulars from the Borough Surveyor.

SEPTEMBER 12-25.—**Athens.**—COURT OF JUSTICE.—An international competition is instituted by the Ministry of the Interior, for the erection of Court buildings, to cost 160,000*l.* The *Official* Gazette may be seen at the Library of the R.I.B.A.

SEPTEMBER 15. — **Lowestoft.** — SCHOOL. — The Lowestoft Education Committee invite designs for an elementary school for 500 boys at Romanhill. Three premiums are offered: 20, 10, and 5 guineas. See advertisement in issue of June 16 for further particulars.

SEPTEMBER 16. — **Manchester.** — LIBRARY AND ART GALLERIES.—Limited to the ten selected competitors in the first competition. See issue of June 23, p. 780.

OCTOBER 4. — **Easington R.D.C.** — 100 model houses for Murton Colliery, Durham. 2½ per cent. on net cost to successful architect.

OCTOBER 7. — **Barnsley.** — EXTENSION OF BATHS.—The Barnsley T.C. invite drawings for proposed extension of Public Baths. Three premiums are offered—50*l.*, 30*l.*, 20*l.* See advertisement in issue of August 11 for further particulars.

OCTOBER 7. — **Evesham U.D.C.** — Designs for laying out site and erecting thereon thirty cottages. Particulars from the Clerk to the Council.

OCTOBER 12.—**Coseley.**—Plans are invited for a school to accommodate about 200 children. Particulars from the Education Offices, Coseley, near Bilston.

OCTOBER 14. — **Bristol.** — ALTERATIONS IN THE GRAND HOTEL. — Particulars from Mr. F. A. Jenkins, 44, Corn-street, Bristol.

OCTOBER 28. — **Salford.** — Extension of office accommodation on workhouse site at Eccles New-road. Premiums 20*l.* and 10*l.* Particulars from the Board of Guardians, Salford. Limited to architects practising in Salford and district only.

OCTOBER 30.—**Holland.**—STAINED GLASS WINDOW.—Designs are invited for a stained glass window to be erected in the University at Groningen. See advertisement in issue of June 9 for further particulars.

OCTOBER 31. — **Marylebone.** — NEW MUNICIPAL BUILDINGS.—Premiums of 100*l.*, 75*l.*, 50*l.* The assessor is Mr. Henry T. Hare, F.R.I.B.A. See advertisement in issue of July 14 for further particulars.

NOVEMBER 1. — **City of St. Petersburg.**—MONUMENT TO ALEXANDER II.—Particulars in our issue of August 13, 1910.

NOVEMBER 30.—**Cardiff.**—TECHNICAL INSTITUTE.—The Cardiff Education Committee invite designs and estimates for a technical institute. See advertisement in issue of August 18 for further particulars. Successful architect to carry out work. Premiums of 125*l.*, 75*l.*, and 50*l.* to other competitors. Mr. J. S. Gibson, assessor.

NOVEMBER 30. — **Hastings.** — EAST SUSSEX HOSPITAL.—The Joint Committee of the East Sussex Hospital and King Edward VII. Memorial Funds invite designs for new hospital. See advertisement in issue of August 25 for further particulars. Premiums of 125*l.*, 75*l.*, and 50*l.* Mr E. T. Hall, assessor.

DECEMBER 29. — **Glasgow.** — DESIGN FOR A BRIDGE.—Designs are invited (Alexander Thomson Travelling Studentship) for a bridge. Premiums of 60*l.* and 20*l.* are offered. See advertisement in issue of December 24 for further particulars.

JANUARY 29, 1912.—**Montevideo.**—Government palace (premiums, 2,125*l.* and 850*l.*) and town improvement scheme (premiums, 1,060*l.*, 640*l.*, and 425*l.*). Conditions may be seen at the Board of Trade, 73, Basinghall-street, E.C.

JANUARY 31, 1912. — **Australia.** — DESIGNS FOR FEDERAL CAPITAL CITY.—The Government of the Commonwealth of Australia invite competitive designs for the laying out of this Federal capital city. See advertisement in issue of September 1 for further particulars.

JULY 1, 1912.—**Dusseldorf.**—A plan for the extension of the City of Dusseldorf. Premiums of 1,000*l.* to 375*l.* Conditions on application to the Chief Burgomaster, Dusseldorf.

No DATE. — **Nottingham.** — BAPTIST CHURCH AND PREMISES.—Limited to Nottingham architects. Particulars from Messrs. Rorke & Jackson solicitors, King-street, Nottingham.

No DATE.—**Rochdale Infirmary.**—EXTENSIONS.—Assessor, Mr. Alex. Graham, F.R.I.B.A.

Contracts.

BUILDING.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

SEPTEMBER 9. — **Aberedw.**—BUILDINGS.—Erection of new farm buildings, etc., at the Court Farm. Plans and specification from Mr. Thomas Roderick, architect, Clifton-street, Aberdare.

SEPTEMBER 9. — **New Tredegar.**—ALTERATIONS, ETC.—For alterations, etc., to the Queen's Hotel, Cymsfiog. Specification from Mr. George Kenshole, M.S.A., Bargoed.

SEPTEMBER 9. — **Ramsgate.** — EXTENSION.—For the extension of the manual room at the school. Specifications by the Committee's Architect, Mr. Wilfred H. Robinson, of Caxton House, Westminster, seen at the offices of the Local Secretary, Mr. A. R. R. Franks, Public Library, Ramsgate.

SEPTEMBER 11. — **Abercych.** — HOUSE.—Alteration of a house. Plans from Mr. J. T. Williams, architect, Napier-street, Cardigan.

SEPTEMBER 11. — **Belfast.**—WAREHOUSE.—Erection of new warehouse premises in Albert-street and Fox-row. Plans and specifications with Messrs. Blackwood & Jury, Ms.R.I.A.I., architects, 41, Donegall-place, Belfast, and quantities from Mr. S. C. Hunter, Scottish Provident-buildings, Belfast, on deposit of 2*l.* 2*s.*

SEPTEMBER 11. — **Port Dinorwic.** — HOUSE.—Erection of a dwelling-house. Plans with Mr. Llewelyn Lloyd Jones, architect and surveyor, Tower-buildings, Carnarvon.

SEPTEMBER 12.—**Exeter.**—ADDITIONS, ETC.—For alterations and additions at the Workhouse laundry. Plans and specifications seen, and quantities from the architect, Mr. R. M. Challice, 14, Bedford-circus, Exeter.

SEPTEMBER 12. — **Gwaun-cae-Gurwen.** — REPAIRS, ETC. — Repairs and alterations of Carmel Congregational Church. Specifications and plans with Mr. D. Morgan, architect, Brynheulog, Gwaun-cae-Gurwen.

SEPTEMBER 12. — **Newton Abbot.**—WOODSHED, ETC.—Erection of a woodshed and the construction of a cold chamber at the Workhouse. Plans and specifications with the architect, Mr. Segar, Union-street, Newton Abbot.

SEPTEMBER 12.—**South Barton.**—WORKS.—For carrying out certain works at the dwelling-house and outbuildings. Plans and specifications from Mr. James Crocker, F.R.I.B.A., architect and surveyor, Stuckey's Bank-chambers, Exeter.

SEPTEMBER 13.—**Wigan.**—SHED.—Erection of a cart-shed at Green Slate Farm, Billinge-Higher-End. Plan and specification with Mr. H. Gordon Ackerley, Clerk, 9, Victoria-buildings, King-street, Wigan.

SEPTEMBER 14.—**Chippenham.**—ADDITIONS, ETC.—Alterations and additions at Castle Coombe Council School. Plans and specifications, on deposit of 1*l.* 1*s.*, from Mr. J. G. Powell, County Surveyor, Trowbridge.

SEPTEMBER 14. — **Dowlais.**—ALTERATIONS.—For alterations to Pantscallog House. Plans and specifications seen, and quantities from the architect, Mr. Thomas Roderick, Clifton-street, Aberdare.

SEPTEMBER 15. — **Barrow-in-Furness.** — POST-OFFICE.—Extension of post-office. Drawings, specification, and contract with the Postmaster, Barrow-in-Furness. Quantities, on deposit of 1*l.* 1*s.*, from the Secretary, H.M. Office of Works, etc., Storey's-gate, London, S.W.

SEPTEMBER 15. — **Bellaghy.**—TOWER.—Erection of a belfry tower to the Catholic Church. Drawings and specification at the Parochial House, Bellaghy, Castledawson, and with Mr. J. V. Brennan, architect, Belfast Bank-chambers, North-street, Belfast.

SEPTEMBER 15.—**Manchester.**—TANK.—Erection of a cast-iron tank at Gaythorn Gasworks. Specification from Mr. F. A. Price, Superintendent, Gas Department, Town Hall, Manchester. Drawings with Mr. J. G. Newbigging, M.Inst.C.E., Engineer, Rochdale-road Station, Manchester.

SEPTEMBER 16. — **Birstall.**—HOUSES.—Erection of three terrace houses. Drawings and specifications seen, and quantities from Messrs. Joseph Firth & Son, architects, 67, Vulcan-road, Dewsbury.

SEPTEMBER 16.—**Kempston.**—ADDITIONS.—Erection of additions to Council school. Drawings and specifications seen, and quantities, on deposit of 1*l.* 1*s.*, from the County Surveyor, Shire Hall, Bedford.

SEPTEMBER 16. — **Nantgarw.** — SHOPS, ETC.—Erection of two shops and house. Plans and specification from Mr. W. D. Thomas, architect and surveyor, Porth.

SEPTEMBER 16.—**Nottingham.**—PAVILION, ETC.—Erection of a pavilion, urinal, etc., at Sycamore-road Recreation Ground. Plans seen, and specifications and quantities from the City Architect, Mr. F. B. Lewis, Guildhall, Nottingham, on deposit of 1*l.* 1*s.*

SEPTEMBER 16. — **Porthcawl.**—RECTORY.—Erection of a rectory at Newton. Plans and specification seen, and quantities, on deposit of 2*l.* 2*s.*, from Messrs. George F. Lambert & Son, architects and surveyors, Bridgend.

SEPTEMBER 16. — **Wattsville.**—SCHOOL.—Erection of a new mixed and infants' school. Plans and specification seen, and quantities from Mr. John Bain, F.R.I.B.A., C.C. Offices, Newport, Mon., on deposit of 2*l.* 2*s.*

SEPTEMBER 18. — **Ripley.**—HOSPITAL.—Erection of a cottage hospital. Quantities, on deposit of 10*s.*, from Mr. R. Argile, architect and surveyor, 36, Oxford-street, Ripley, Derby.

* SEPTEMBER 18. — **Stepney.** — CINEMATOGRAPH ENCLOSURE.—The Stepney B.C. invite tenders for a cinematograph enclosure at their Goulston-street Baths. See advertisement in this issue for further particulars.

SEPTEMBER 19. — **Bridlington.**—STATION.—For improvements at station, for the North-Eastern Railway Company. Plans and specification seen, and quantities from Mr. W. Bell, the Company's Architect, at York.

SEPTEMBER 19. — **Durham.**—SCHOOLS.—Alterations and improvements at Ford and Blaydon Council schools; erection of caretakers' houses at Greenland, South Moor, and Dawdon Council schools. Plans and specifications seen, and quantities from Mr. A. J. Dawson, Clerk to the Education Committee, Shire Hall, Durham.

SEPTEMBER 19. — **Sale.** — BATHS.—Erection of Public Baths. Plans and specification seen, and quantities, on deposit of 1*l.* 1*s.*, from Mr. W. H. Mitchell, A.R.I.B.A., architect, 94, Market-street, Manchester.

SEPTEMBER 19. — **Whelley.**—ADDITIONS.—Erection of additions at the Sanatorium. Drawings and bills of quantities from the Borough Engineer, King-street West, Wigan.

* SEPTEMBER 21. — **London, E.** — ENGINEER'S HOUSE, ETC.—The Guardians of Mile End Old Town invite tenders for enlargement of Chief Engineer's house, and erection of lavatories, etc., on Bancroft-road premises, Mile End, E. See advertisement in this issue for further particulars.

SEPTEMBER 25. — **Barnes.**—CONVENIENCES.—For building two sanitary conveniences (above ground) at Mortlake. Drawings and specification seen, and form of tender from the Engineer and Surveyor, Council House, High-street, Mortlake, S.W.

SEPTEMBER 25.—**Bristol.**—TRANSIT SHED.—Construction of a single-floor transit shed on the west wall of the Royal Edward Dock, Avonmouth. Deposit of 5*l.* to Mr. W. W. Squire, Engineer, Engineer's Office, Cumberland-road, Bristol.

* SEPTEMBER 26.—**Epsom.**—OPERATION WARD.—The Epsom Guardians invite tenders for an operation ward at Workhouse infirmary. See advertisement in this issue for further particulars.

* OCTOBER 3. — **Birmingham.** — TELEGRAPH STORES. — The Commissioners of H.M. Works and Public Buildings invite tenders for the finishings (second) contract at block C, Birmingham Telegraph Stores. See advertisement in this issue for further particulars.

NO DATE. — **Farnham.**—ADDITIONS.—For additions to the Wesleyan schoolroom. Plans, etc., at the schoolroom. Mr. Wonnacott, Devonshire House, Fairfield, Farnham.

NO DATE.—**Kettering.**—CHURCH.—Erection of Carey Memorial Church. Messrs. Cooper & Williams, architects, Central-chambers, Market-place.

NO DATE.—**Leek.**—SCHOOL.—Erection of a new Council school. Quantities, on deposit of 1*l.* 1*s.*, from Mr. Graham Balfour, Director of Education, County Education Offices, Stafford.

* NO DATE.—**London, S.E.**—ARTISANS' DWELLINGS.—Messrs. Palgrave invite tenders for two blocks of artisans' dwellings. See advertisement in this issue for further particulars.

NO DATE. — **Merioneth.** — ADDITIONS.—Alterations and additions to Festiniog Council School. Plans, specification, and particulars from the County Architects, Messrs. Deakin & Howard Jones, M.S.A., Plas Ynys, Borth, S.O.

NO DATE.—**Salisbury.**—RESIDENCE, ETC.—Erection of a motor garage and residence. Particulars from Mr. A. C. Botham, M.S.A., A.M.Inst.C.E., architect, etc., 32, Chipper-lane, Salisbury.

NO DATE.—**Stonehaven.**—COTTAGES.—Erection of six small model cottages. Quantities from Messrs. M'Millan, architects, 105, Crown-street, Aberdeen.

ENGINEERING, IRON, AND STEEL.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

SEPTEMBER 8. — **Whimple.** — BRIDGE.—For rebuilding the south parapet wall and wing walls and general repairs and fencing at Botley Bridge. Specification from Mr. H. Michelmore, Clerk of the Council, Castle of Exeter.

SEPTEMBER 11.—**Hebburn.**—BRIDGE.—Construction of a light steel bridge across the Wallsend and Hebburn Coal Company's railway. Particulars from the Surveyor, Mr. H. Paterson, Council Offices, Hebburn.

SEPTEMBER 16. — **Snydale.**—HEATING.—Installation of heating apparatus at the Council school. Specifications from Mr. C. Harris, Education Offices, Knottingley.

SEPTEMBER 18. — **London.**—HEATING.—Installation of low-pressure hot-water heating apparatus at the Gainsborough-road School, West Ham. Mr William Jacques, A.R.I.B.A., Architect to the Education Committee, 2, Fen-court, Fenchurch-street, E.C. Deposit of 1*l*.

SEPTEMBER 19.—**Swinton.**—WELL.—For sinking a well. Specification, on deposit of 1*l*., from Mr. H. Birks, Engineer and Surveyor, Council Offices, Swinton, Yorks.

SEPTEMBER 30 — **Varna (Sofia).** — STATION.—Erection of a power station. Particulars from the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

NO DATE. — **Leake.**—BRIDGE.—Construction of new bridge and repairs to two other bridges. Plans and specifications from Mr. G. P. Pearson, P.A.S.I., Surveyor, Sutton Bonington.

FURNITURE, PAINTING, MATERIALS, etc.

SEPTEMBER 8. — **Mardy.** — PAINTING, ETC.—For papering, painting, etc., at Mardy Hotel, Marda, Rhondda Valley. Specification from Mr. W. D. Morgan, M.S.A., architect, Pentre.

SEPTEMBER 9. — **Hertford.** — PAINTING.—For painting Workhouse buildings. Specification seen, and particulars with the Master at the Workhouse, Hertford.

SEPTEMBER 9.—**Jarrow.**—PAINTING.—For painting at the fire-station. Specification from Mr. J. S. Weir, A.M.Inst.C.E., Borough Surveyor, Town Hall, Jarrow.

SEPTEMBER 11. — **Newark.**—PAINTING.—For repainting premises at the Cattle Market. Specifications with Messrs. Sheppard & Lockton, architects and surveyors, Bargate, Newark.

SEPTEMBER 12.—**Rhondda Valley.**—PAINTING.—For painting, etc., at the Baglan Hotel, Treherbert, Wales. Specification at the hotel.

SEPTEMBER 12.—**Treherbert.**—PAINTING, ETC.—For painting, papering, etc., at the Baglan Hotel, Treherbert, Rhondda Valley. Specification from Mr. W. D. Morgan, M.S.A., architect, Pentre.

SEPTEMBER 13. — **Newport.** — PAINTING.—For painting the Workhouse. Specification at the Union Offices, Queen's-hill. Mr. A. H. Rees, Clerk.

SEPTEMBER 13. — **Styal.**—PAINTING.—For painting, etc., at the Cottage Homes, schools, and house. Specifications from the Guardians' Offices, All Saints', Manchester. Mr. D. S. Bloomfield, Clerk.

SEPTEMBER 14. — **Blackley.** — PAINTING.—For painting outside wood and iron work at the Booth Hall Infirmary. Specifications at the Infirmary. Mr. Edward W. Ogden, Clerk to the Guardians, Union Offices, Cheetham Hill-road, Manchester.

★ SEPTEMBER 14. — **London, S.W.**—PAINTING.—The Lambeth B.C. invite tenders for painting boundary railings and gates at cemetery, Blackshaw-road, Tooting, S.W. See advertisement in this issue for further particulars.

★ SEPTEMBER 19. — **Edmonton.** — PORTLAND CEMENT.—The Edmonton U.D.C. invite tenders for supply and delivery of Portland cement. See advertisement in this issue for further particulars.

★ SEPTEMBER 23. — **Stanwell.** — FENCING, ETC.—The Staines Joint Hospital Committee invite tenders for Jarrah wood park pale fencing and iron fencing, with gates, posts, etc., at Stanwell, Middlesex. See advertisement in this issue for further particulars.

NO DATE.—**Merioneth.**—PAINTING.—For painting at Glyndyfrdwy Council School masters' house. Specification and particulars from the County Architects, Messrs. Deakin & Howard Jones, M.S.A., Plas Ynys, Borth, S.O.

ROADS, SANITARY AND WATER WORKS.

SEPTEMBER 11.—**Blaby.**—SEWER.—For extension of a 9-in. sewer. Plans seen, and quantities, on deposit of 1*l*. 1s., from Mr. B. A. Shires, Clerk, 1, Friar-lane, Leicester.

SEPTEMBER 11.—**Evershot.**—SEWER.—Laying of new sewer. Plans and specifications seen at the offices of Mr. S. R. Baskett, Solicitor, Everahot.

SEPTEMBER 12.—**Crewe.**—STREETS.—For making and sewering streets. Plans and specifications, on deposit of 1*l*., from Mr. G. Eaton-Shore, Borough Surveyor, Earle-street, Crewe.

SEPTEMBER 12. — **Shoeburyness.** — GRANITE.—Supply of broken granite. Mr. Frederic Gregson, Clerk, 46, Alexandra-street, Southend-on-Sea.

SEPTEMBER 12. — **Swansea.** — STREETS.—For private street works. Plan and specification with the Borough Surveyor, 13, Somerset-place, Swansea.

SEPTEMBER 12. — **Tipton.** — SEWERS.—Construction of the sewers. Drawings and specification seen, and quantities, on deposit of 3*l*. 3s., from Mr. Wm. H. Jukes, M.E., Engineer and Surveyor, Surveyor's Offices, Public Offices, Tipton.

SEPTEMBER 13. — **Littleport.** — SEWER.—For laying sewer. Plan and specification with Mr. E. B. Claxton, Clerk, Egremont-street, Ely, Cambs.

SEPTEMBER 15. — **Falmouth.** — SEWAGE.—For sewage outfall works for Gyllyngvase. Plans seen, and specification and quantities, on deposit of 2*l*. 2s., from the Borough Surveyor, Mr. John S. Walton, Municipal Offices, Falmouth, or the Engineer, Mr. Fredk. J Commin, 5, Victoria-street, Westminster.

SEPTEMBER 16. — **Rotherham.** — ROADS.—For making-up roads. Drawings and specifications seen, and quantities from the Borough Engineer, Town Hall, Rotherham.

SEPTEMBER 16. — **Windermere.**—SEWERAGE, ETC.—For construction of new street and sewage works. Plans, specifications and general conditions at the offices of the Council, and quantities, on deposit of 5*l*. 5s., the Council's Engineers, Messrs. Willcox, Raikes, & Reed, at 63, Temple-row, Birmingham.

SEPTEMBER 18. — **Baildon.** — SEWER.—Construction of main sewer. Specifications and quantities from Mr. J. Myers, Surveyor, Council Office, Baildon, Yorks. Deposit of 5s.

SEPTEMBER 18. — **Spennymoor.** — ROADS.—For making of roads. Plans and specifications with Mr. C. R. Spencer, Surveyor, Council Offices, Spennymoor.

SEPTEMBER 19. — **Acton.** — SEWER, ETC.—For laying pipe sewer and making-up private streets. Plans and specifications seen, and quantities from Mr. F. Sadler, Surveyor, Council Offices, Winchester-street, Acton, W.

SEPTEMBER 19. — **Leith.**—SEWER.—Construction of pipe sewer in Blackie-road and in New-street. Plans and specifications at the Burgh Surveyor's Office, Charlotte-street

SEPTEMBER 20. — **Blaina.** — MATERIALS.—Supply of materials. Mr. W. J. Davies, Surveyor, Blaina, Mon.

SEPTEMBER 20. — **Rochdale.** — STREETS.—For sewering, levelling, paving, etc., of streets. Plans and specifications seen, and quantities from the Borough Surveyor.

SEPTEMBER 21. — **Blackwood.** — ROADS.—Construction of new roads. Plans and specifications seen, and quantities, on deposit of 1*l*. 1s., from Mr. A. F. Webb, M.S.A., Architect and Surveyor, Blackwood, Mon.

★ SEPTEMBER 23.—**Stanwell.**—ROADS, ETC.—The Staines Joint Hospital Committee invite tenders for construction of roads and footpaths at Stanwell, Middlesex. See advertisement in this issue for further particulars.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*CHIEF ASSISTANT (EDUC. SURVEYOR'S DEPT.)	Northampton C.C.	120*l*. per annum	Sept. 13
*ARCHITECTURAL DRAUGHTSMAN	West Riding C.C.	15s*l*. per annum	Sept. 18
*WOODWORK INSTRUCTOR	London C.C.	120*l*. per annum	Sept. 18

Auction Sales.

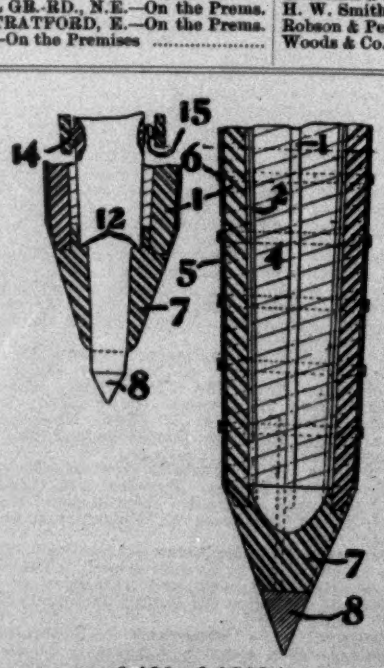
Nature and Place of Sale.	By whom Offered.	Date of Sale.
*DEALS, BATTENS, BOARDS, TIMBER, ETC.—Great Hall, Winchester House, E.C.	Churchill & Sim	Sept. 13
*PLANT, ETC., OF ZINCWKR., PLBR., ETC., 285, BETHNAL GR.-RD., N.E.—On the Prems.	H. W. Smith	Sept. 14
*STK. OF HOUSEBRKG. CONTR., ETC., 131, HIGH-ST., STRATFORD, E.—On the Prems.	Robson & Perrin	Sept. 14
*CONTRACTOR'S STOCK AND PLANT, NORTHAMPTON—On the Premises	Woods & Co.	Sept. 18

PATENTS—*Continued from page 286.*

engagement of teeth 7 on bowed springs 4, 4a, mounted on the edges of the sash-stiles with corrugated strips 3 secured on the frame. The springs 4, 4a, are secured at one end to the sash-stiles by screws, while the other ends are secured by screws passing through slots 6 in the springs. On the bottom sash is mounted a spring catch 11 of ordinary construction, sliding in a casing formed by bending over the upper end of the spring 4a, and engaging a recess 8 in the upper sash.

8,488 of 1910.—William John Stewart: Piles.

This relates to hollow, wooden, and other piles, which may, after driving, be filled with concrete; the piles are constructed of stout longitudinal ribs 1, alternating with lighter ribs 2, and connected together by means of stays. A light sheathing 4 of wood is connected to the ribs; and on the outside of the sheathing are secured longitudinal pieces 5 of hoop iron, to the exterior of which are fastened hoops 6. The shoe, which consists of a balk of timber 7, having an iron or steel point 8, is attached to the ribs 1, 2, and the sheathing 4, and vertical pieces 5 may also be brought down over the shoe. The pile is driven by means of a core provided with fixed or adjustable horizontal or longitudinal ribs, which

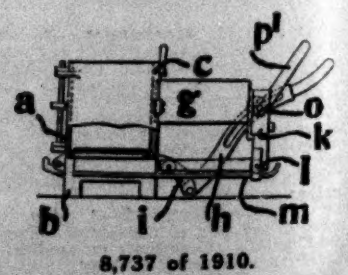


8,488 of 1910.

contact with the lighter ribs of the pile. A solid core 10 projects through the bottom of a pile, and is provided with shoulders 12, or with projections 14, 15, for assisting in pulling the pile downwards.

8,737 of 1910.—Robert Lindenthal: Apparatus for moulding concrete blocks.

This relates to improvements in moulding-machines for concrete blocks of the type com-



8,737 of 1910.

prising a mould frame having hinged turn-down sides and sliding cores, guided in apertures in the rear wall. The mould frame *a* is

removably supported upon a stand *b*, and the cores *g* are supported and guided by means of legs *k* fitted with rollers *l* running on rails *m*. A lever *h* for operating the cores is formed with a slotted portion embracing a shaft *o*, connecting the legs *k*, and is pivoted to an arm *i*, which forms an additional support for the mould frame. The withdrawal of the cores from the mould is facilitated by cam levers *p*¹ pivoted to the shaft *o*.

SOME RECENT SALES OF PROPERTY :

ESTATE EXCHANGE REPORT.

August 21.—By FERRIS & PUCKRIDGE.

Broad Town, Wilts.—Broad Town Farm, etc., 114 acres, f.	£3,738

August 22.—By VERNON SHORE.

Elham, Kent.—Ottinge Court Farm, 187 acres, f.	3,455

By BOULTON & COOPER.

Slingsby, Yorks.—Arable and grass land, 98 acres, f.	3,200

August 24.—By VENTON, BULL, & COOPER.

Ramsgate, Kent.—Picton-rd., etc., f.g. rents 139l. 14s., reversion in 57 and 68 yrs.	2,060

By DANIEL SMITH, SON, & OAKLEY.

Charmouth, Dorset.—Accommodation land, 15 a. 3 r. 5 p., f.	2,050

August 25.—By NICHOLAS.

Newington, Oxon.—Part of the Holcombe Estate, 73 acres, f.	2,302

August 29.—By W. M. STICKNEY & SONS.

Withernsea, Yorks.—Freehold farm, 50 acres	2,360
Tithe rent-charge 23l. 11s. 2d.	215

By KING & CHASEMORE.

Amberley, Sussex.—Part of the Dale Park Estate, 91 acres, f.	6,505

August 30.—By WYATT & SON.

Westbourne, Sussex.—Freehold estate, 254 a. 2 r. 38 p.	11,000

August 31.—By JOHN BOTT & SONS.

Islington.—Lambton-rd., f.g. rents 19l. 15s., reversion in 68 and 72 yrs.	390
Norwood.—215, Gipsy-rd., f., p.	250
Brixton.—104, Geneva-rd., u.t. 55 yrs., g.r. 6l., w.r. 30l. 16s.	180

By CAMERONS.

Cricklewood.—73 and 75, Mora-rd., u.t. 97 yrs., g.r. 12l. 12s., w.r. 109l. 6s.	460
19, Melrose-av., u.t. 81 yrs., g.r. 7l. 10s., p.	405

By JOHN DAVEY & CO.

Charlton.—198 and 202, Woolwich-rd., u.t. 59 yrs., g.r. 8l. 8s., w.r. 67l. 12s.	375
Plumstead.—59, Robert-st., f., w.r. 20l. 16s.	150

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; h.h. for beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

TERMS OF SUBSCRIPTION.

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

Per 1000 Alongside, in River.	£ s. d.
Best Stocks	1 13 0
Picked Stocks for Facings	2 7 0

Per 1000, Delivered at Railway Depôt.

	£ s. d.		£ s. d.
Flettons	1 9 0	Double Headers	13 7 6
Best Fareham Red	3 12 0	One Side and two Ends	17 7 6
Best Red Pressed Ruabon Facing	5 0 0	Two Sides and one End	18 7 6
Best Blue Pressed Staffordshire	3 15 0	Splays & Squints	15 17 6
Do. Bullnose	4 0 0	Best Dipped Salt Glzd. Str'tch'rs	10 17 6
Best Stourbridge Fire Bricks	3 14 0	Headers	10 7 6
GLAZED BRICKS.		Quoins, Bullnose, and Flats	14 7 6
Best White and Ivory Glazed Stretchers	10 17 6	D'ble Stretchers	16 7 6
Headers	10 7 6	Double Headers	13 7 6
Quoins, Bullnose, and Flats	14 7 6	One Side and two Ends	17 7 6
D'ble Stretchers	16 7 6	Two Sides and one End	18 7 6
		Splays & Squints	15 17 6

Second Quality White and Dipped Salt Glazed, £1 5s. per 1000 less than best.

BRICKS, &c. (*Continued*).

	s. d.	
Thames and Pit Sand	6 9	per yard, delivered.
Thames Ballast	5 3	" "
Best Portland Cement	29 0	per ton, "
Best Ground Blue Lias Lime	19 0	" "

NOTE—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 6d. per yard delivered
Stourbridge Fireclay in sacks	27s. 0d. per ton at rly dpt

STONE.

Per Ft. Cube.

	s. d.
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½
PORTLAND STONE (20 ft. average)—	
Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 1
White Basebed, delivered on road waggons Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 2½

Per Ft. Cube, delivered at Railway Depôt.

	s. d.		s. d.
Ancaster in blocks	1 10	Closeburn Red Freestone	2 0
Beer in blocks	1 6	Red Mansfield Freestone	2 4
Greenshill in blocks	1 10	Talacre & Gwespyr Stone	2 8
Darley Dale in blocks	2 4		
Red Corsehill in blocks	2 2		

YORK STONE—*Robin Hood Quality.*

Per Ft. Cube, Delivered at Railway Depôt.	s. d.
Scappled random blocks	2 10

Per Ft. Super., Delivered at Railway Depôt.

6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3
6 in. rubbed two sides ditto, ditto	2 6
3 in. sawn two sides slabs (random sizes)	0 11½
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7
1½ in. to 2 in. ditto, ditto	0 6

HARD YORK—

Per Ft. Cube, Delivered at Railway Depôt.	
Scappled random blocks	3 0

Per Ft. Super., Delivered at Railway Depôt.

6 in. sawn two sides landing to sizes (under 40 ft. super.)	2 8
6 in. rubbed two sides ditto	3 0
3 in. sawn two sides slabs (random sizes)	1 2
2 in. self-faced random flags	0 5

SLATES.

Per 1000 of 1200 at Railway Depôt.

In. In.	£ s. d.	In. In.	£ s. d.
20×10 best blue Bangor	13 2 6	20×10 best Eur'ka unfading green	15 17 6
20×12 ditto	13 17 6	20×12 ditto	18 7 6
20×10 1st quality ditto	13 0 0	18×10 ditto	13 5 0
20×12 ditto	13 15 0	16×8 ditto	10 5 0
16×8 ditto	7 5 0	20×10 permanent green	11 12 6
22×10 best blue Portmadoc	12 12 6	18×10 ditto	9 12 6
16×8 ditto	6 12 6	16×8 ditto	6 12 6

TILES.

At Railway Depôt.

	s. d.		s. d.
Best plain red roofing (per 1000)	42 0	Do. Ornamental (per 1000)	52 6
Hip and Valley (per doz.)	3 7	Hip and Valley (per doz.)	4 0
Best Broseley (per 1000)	50 0	Best Ruabon red, brown, or brindled (Edw'ds) (per 1000)	57 6
Do. Ornamental (per 1000)	60 0	Do. Ornamental (per 1000)	50 0
Hip (per doz.)	4 0	Hip (per doz.)	4 0
Valley (per doz.)	3 0	Valley (per doz.)	3 6
Best "Hartshill" brand, plain and faced (per 1000)	50 0	Staffords. (Hanley) Reds or Brindled (per 1000)	42 6
Do. pressed (per 1000)	47 6	Hand-made sand-faced (per 1000)	45 0
		Hip (per doz.)	4 0
		Valley (per doz.)	3 6

WOOD.

BUILDING WOOD.	At per standard. £ s. d.		£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	14 0 0	...	15 10 0
Deals: best 3 by 9	13 10 0	...	14 10 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 10 0	...	12 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.	
Deals: seconds	1 0 0	less than best.	
Battens: seconds	0 10 0	"	"
2 in. by in. and 2 in. by 6 in.	9 10 0	...	10 10 0
2 in. by 4½ in. and 3 in. by 5 in.	9 0 0	...	10 0 0
Foreign Sawn Boards— 1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.	
¼ in.	1 0 0	"	
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 5 0 0	...	5 10 0
Seconds	4 10 0	...	5 0 0
Small timber (8 in. to 10 in.)	3 17 6	...	4 0 0
Small timber (6 in. to 8 in.)	3 5 0	...	3 10 0
Swedish balks	2 12 6	...	3 0 0
Pitch-pine timber (30 ft. average)	4 10 0	...	5 5 0

JOINERS' WOOD.	At per standard. £ s. d.		£ s. d.
White Sea: first yellow deals, 3 in. by 11 in.	24 10 0	...	25 10 0
3 in. by 9 in.	22 10 0	...	23 10 0
Battens, 2½ in. and 3 in. by 7 in.	17 0 0	...	18 0 0
Second yellow deals, 3in. by 11in.	19 0 0	...	20 0 0
" " 3 in. by 9 in.	18 0 0	...	19 10 0
Battens, 2½ in. and 3in. by 7 in.	14 0 0	...	15 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	14 0 0	...	15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 10 0	...	12 10 0

WOOD (*Continued*).

JOINERS' WOOD (*Continued*)—	At per standard. £ s. d.		£ s. d.
Petersburg: first yellow deals, 3 in. by 11 in.	21 10 0	...	22 10 0
Do. 3 in. by 9 in.	18 10 0	...	19 10 0
Battens	14 0 0	...	15 0 0
Second yellow deals, 3 in. by 11 in.	16 10 0	...	17 10 0
Do. 3 in. by 9 in.	15 0 0	...	16 0 0
Battens	11 10 0	...	12 10 0
Third yellow deals, 3in. by 11 in.	13 10 0	...	14 10 0
Do. 3 in. by 9 in.	13 0 0	...	14 0 0
Battens	10 10 0	...	11 0 0
White Sea and Petersburg—			
First white deals, 3 in. by 11 in.	15 0 0	...	16 0 0
" " 3 in. by 9 in.	14 0 0	...	14 10 0
Battens	11 10 0	...	12 10 0
Second white deals, 3in. by 11in.	14 0 0	...	15 0 0
" " 3 in. by 9 in.	13 0 0	...	14 0 0
Battens	10 10 0	...	11 0 0
Pitch-pine: deals	19 0 0	...	21 0 0
Under 2 in. thick extra	0 10 0	...	1 0 0
Yellow Pine—First, regular sizes	44 0 0	upwards.	
Oddments	32 0 0	"	
Seconds, regular sizes	33 0 0	"	
Oddments	28 0 0	"	
Kurai Pine—Planks per ft. cube	0 3 6	...	0 5 0
Danzig and Stettin Oak Logs—			
Large, per ft. cube	0 3 0	...	0 3 9
Small " "	0 2 6	...	0 2 6
Wainscot Oak Logs, per ft. cube	0 5 6	...	0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8½	...	0 0 9½
¼ in. do. do.	0 0 7	...	—
Dry Mahogany—Houndras, Tabasco, per ft. super. as inch	0 0 10	...	0 1 1
Selected, Figury, per ft. super. as inch	0 1 6	...	0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	...	0 1 0
Teak, per load	18 0 0	...	22 0 0
American Whitewood planks, per ft. cube	0 4 0	...	0 5 0
Prepared Flooring, etc.—	Per square.		
1 in. by 7 in. yellow, planed and shot	0 13 6	...	0 17 0
1 in. by 7 in. yellow, planed and matched	0 14 0	...	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	...	1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	...	0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	...	0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	...	0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	...	0 13 6
1 in. by 7 in. " "	0 14 0	...	0 18 6
¾ in. by 7 in. white " "	0 10 0	...	0 11 0
1 in. by 7 in. " "	0 12 9	...	0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.		£ s. d.
Rolled Steel Joists, ordinary sections	7 0 0	...	7 10 0
Compound Girders, ordinary sections	9 0 0	...	10 0 0
Steel Compound Stanchions	11 0 0	...	12 0 0
Angles, Tees, and Channels, ordinary sections	9 0 0	...	10 0 0
Flitch Plates	9 0 0	...	9 10 0
Cast Iron Columns & Stanchions, including ordinary patterns	7 10 0	...	8 10 0

METALS.

	Per ton, in London. £ s. d.		£ s. d.
IRON—			
Common Bars	8 10 0	...	9 0 0
Staffordshire Crown Bars, good merchant quality	8 15 0	...	9 5 0
Staffordshire "Marked Bars"	10 10 0	...	—
Mild Steel Bars	8 15 0	...	9 5 0
Hoop Iron, basis price	9 5 0	...	9 10 0
" " Galvanised	17 0 0	...	—
("And upwards, according to size and gauge.)			
Sheet Iron Black—			
Ordinary sizes to 20 g.	9 15 0	...	—
" " 24 g.	10 15 0	...	—
" " 26 g.	12 5 0	...	—
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	15 0 0	...	—
Ordinary sizes to 22 g. and 24 g.	15 10 0	...	—
" " 26 g.	16 10 0	...	—
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.	18 0 0	...	—
" " 22 g. and 24 g.	18 10 0	...	—
" " 26 g.	20 0 0	...	—
Galvanised Corrugated Sheets—			
Ordinary sizes, 6ft. to 8ft. 20 g.	14 10 0	...	—
" " 22 g. and 24 g.	14 15 0	...	—
" " 26 g.	16 5 0	...	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. to 20 g. and thicker	12 0 0	...	—
Best Soft Steel Sheets, 2 g. & 24 g.	13 0 0	...	—
" " 26 g.	15 0 0	...	—
Cut Nails, 3 in. to 6 in.	10 10 0	...	11 0 0

(Under 3 in., usual trade extras.)

LEAD, &c.

	£ s. d.		£ s. d.
LEAD—Sheet, English, 4lb. and up	17 12 6	...	—
Pipe in coils	18 2 6	...	—
Soil pipe	21 2 6	...	—
Compo pipe	21 2 6	...	—
ZINC—Sheet—	In casks of 10 cwt.		
Vielle Montagne	34 0 0	...	—
Silesian	33 10 0	...	—
Zinc, in bundles, 1s. per cwt. extra.			
COPPER—			
Strong Sheet per lb.	0 1 0	...	—
Thin "	0 1 1	...	—
Copper nails "	0 0 10	...	—
Copper wire "	0 0 10	...	—
BRASS—			
Strong Sheet "	0 0 11	...	—
Thin "	0 1 0	...	—
TIN—English Ingots "	0 1 11	...	—

LEAD, &c. (*Continued*).

		£ s. d.	
SOLDER—Plumbers'	per lb.	0 0 8½	—
Tinmen's	"	0 0 11	—
Blowpipe	"	0 1 2	—

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.*

Per Ft., Delivered.

15 oz. thirds	2¼d.	26 oz. fourths	3½d.
" fourths	1½d.	32 oz. thirds	3d.
21 oz. thirds	3d.	" fourths	4½d.
" fourths	2¼d.	Fluted Sheet, 15 oz.	3½d.
26 oz. thirds	4d.	" 21 oz.	4½d.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.*

Per Ft., Delivered.

⅛ Hartley's	2d.	Figured Rolled, Oxford Rolled, Oceanic, Arctic, Muffled, and Rolled Cathedral, white	3½d.
¼ "	2½d.		
½ "	2½d.	Ditto, tinted	5d.

Not less than three crates.

OILS, &c.		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 3 9
" " " in barrels	"	0 3 10
" " " in drums	"	0 4 0
Boiled " " in barrels	"	0 4 0
" " " in drums	"	0 4 3
Turpentine in barrels	"	0 3 3
" in drums	"	0 3 5
Genuine Ground English White Lead, per ton		22 0 0
Red Lead, Dry	"	20 10 0
Best Linseed Oil Putty	per cwt.	0 [illegible] 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 6
Fine Elastic Carriage	0 12 0
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 10 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flating Varnish	0 18 0
White Pale Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 0
Berlin Black	0 16 0
Knotting	0 10 9
French and Brush Polish	0 10 6

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* Denotes *accepted*. † Denotes *provisionally accepted*.

ALDRIDGE.—For extensions to R.A.O.B. Orphanage. Messrs. Jeffries & Shipley, architects, Walsall:—

C. Smithies & Son, Ltd.	£2,616	H. Morgan	£2,370
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W. Wistance	2,475	H. Dorse	2,255
S. Wootton	2,439	J. Guest & Son	2,250
A. G. Smith	2,400	J. C. Hill	2,210
F. J. Smith	2,398	J. W. Smith & Co.	2,198
T. Mason	2,395	R. Speake & Sons, Wolverhampton*	2,144
T. & S. Ham	2,388		

AMMANFORD.—For erection of a public hall. Mr. D. Thomas, architect, 10, Quay-street, Ammanford:—

D. Howells & Sons	£4,156	W. Williams	£3,111
Jones Bros.	3,350	W. Evans	2,967
J. S. Thomas	3,333	R. Wilkins & Sons	2,944
J. Evans	3,264	T. Callard	2,835 15 11
W. Michael & Sons	3,210	B & E. Jones, Brynhyfryd, Penybank, Ammanford*	2,760
D. B. John & Co.	3,130		

ATTLEBOROUGH (Norfolk).—New gas manager's house, for the Attleborough Gas Company. Mr. Herbert J. Green, Architect and Diocesan Surveyor, Norwich, King's Lynn, and Lowestoft:—

H. Smith	£439	A. J. Harrison	£421 1 4
G. R. Barnard	431	E. J. Smith, Bunwell, Norfolk†	414
W. Peake-Vout	430		

DEVIZES.—For erection of two new wards and alterations and additions to the existing buildings at the Cottage Hospital, for the Committee. Mr. A. J. Randell, M.S.A., architect, 4, St. John-street, Devizes:—

W. E. Chivers & Sons	£2,198	T. Stone	£1,930
E. Linsey	2,080	F. Rendell & Sons	1,898
Parsons Bros.	1,997	H. Ash, Devizes*	1,838

FARNBOROUGH.—For erection of a cinematograph theatre. Mr. G. S. Valentin, theatre architect, 18, Charing Cross-road, W.C. Quantities by architect:—

W. Watson	£2,696	J. B. Seward	£2,397
E. C. Hughes	2,649	W. E. Blake, Ltd.	2,367
Norris & Co.	2,640	Martin Wells, Ltd.	2,199
Cockerell & Co.	2,587	F. G. Pope & Co., London, S.W.*	1,999 17 6
W. J. Snuggs	2,485		
G. Kemp & Co.	2,439		

LLANLLYFNI.—For painting and repairs of the Salem Chapel and minister's house. Mr G. Llewelyn Griffith, architect, 105, High-road, Llanllyfni:—

D. Jones	£45 16	W. O. Williams, Carnarvon*	£39 16
W. H. Roberts	43 16		

PONTEFRACT.—For an extension to the engine-house at the Roall pumping-station. Messrs. G. & F. W. Hodson, M.Inst.C.E., engineers, Loughborough:—J. Fairbairn & Son, Hensall* £590

SHEERNESS.—For erection of fourteen houses. Mr. Marshall Harvey, architect, Sittingbourne:—

H. R. Richardson	£4,960	C. E. Skinner	£4,358
S. R. Spinner	4,873	A. Osborne	3,920
Moore & Roberts	4,562	W. J. Sone	3,818 10
Myall Bros.	4,500	L. Seager, Sittingbourne*	3,762
A. H. Foyd	4,489		
H. T. Roads	4,456 7		

SILKSWORTH.—For erection of a temperance hall. Mr. J. Wilson Hays, architect, Wingate. Quantities by the architect:—

H. E. Pitt	£921 18 2	J. M. Wright	£756 12 0
Page & Wight	879	R. C. Brown, Stockton-road, Sunderland*	739
J. W. White	825		
Clerey & Charlton	820		
Golding & Ward	809		

WARWICK.—For erection of a pair of children's homes, etc., for the Warwick Union. Mr. F. G. Cundall, M.S.A., architect, 4, Parade, Leamington Spa:—

T. Bailey	£2,410	H. J. Dawson	£2,132
Sheasby & Hobbis	2,275	A. T. Dawkes	2,120
Smith & Sons	2,270	W. Roe	2,044
J. S. Kimberley	2,233	R. P. Gathercole, Leamington‡	2,000
R. Bowen	2,186		

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